Iowa Department of Natural Resources
Environmental Protection Commission

ITEM **12** **DECISION**

TOPIC **Final Adoption – Chapter 69 – Onsite Wastewater Treatment and Disposal Systems, NPDES General permit #4 and Chapter 64, "Wastewater Construction and Operation Permits"**

The Commission is requested to approve the amendments to Chapter 69, "Onsite Wastewater Treatment and Disposal Systems". The amendments to Chapter 69 include the addition of a time of transfer section as required by Senate File 261, the addition of new technologies and technology specification updates, and renewal of NPDES General Permit #4 for discharging onsite systems. IAC 567-Chapter 64.15 will change to reflect the new effective dates of the NPDES General Permit #4.

Three public hearings were held on December 2, 3, and 4, 2008, in Des Moines, Iowa City and Ft. Dodge respectively. Written comments were received through December 5, 2008. Thirty persons or groups provided oral or written comments on the proposed amendments. The responsiveness summary addresses all of the comments received.

The following is a summary of the items that have been changed based on comments received:

- The time of transfer inspector disciplinary action section, taken from Chapter 82, "Water Well Contractor Certification", was replaced with the more up to date language used in Chapter 81, "Water and Wastewater Operator Certification".
- The effective date of time of transfer inspections was added, July 1, 2009, since it will be after the effective date of these rules.
- The dates used for continuing education requirements for time of transfer inspectors were slightly modified to coincide with other similar dates used in the Operator Certification database.
- Language was added to the continuing education section for time of transfer inspectors to exempt newly certified inspectors from having to earn continuing education credits in a shorter period than two years because of the date newly certified.
- Noncompliance with child support language was added to the time of transfer inspector certification requirements.
- Changes to the sizing of chambers were removed and the current sizing requirements were retained. Expanded polystyrene aggregate is to be sized similarly.
- Chamber sizing requirements were changed to ensure chambers of sufficient height are used to approximate a conventional soil absorption trench.

- The definition of drainage ditch was removed.
- The definition of expanded polystyrene aggregate was changed to exclude a proprietary manufacturing process.
- A soils and vegetative cover section was added to the at-grade soils absorption system section. A requirement to divert surface water was also added.
- The phrase “if applicable” was added to each discharging systems section in the effluent sampling subsection to clarify which systems require sampling.

The Commission is requested to approve this Final Rule.

Charles C. Corell, Chief
Water Quality Bureau
Environmental Services Division

December 22, 2008

ENVIRONMENTAL PROTECTION COMMISSION [567]
Adopted and Filed

Pursuant to the authority of Iowa Code sections 455B.173 and 455B.197, the Environmental Protection Commission hereby adopts amendments to Chapter 64, "Wastewater Construction and Operation Permits," to rescinds Chapter 69, "Onsite Wastewater Treatment and Disposal Systems" and to adopt new Chapter 69, "Private Sewage Disposal Systems," Iowa Administrative Code.

Pursuant to Iowa Code section 455B.173(3), the Commission is required to establish, modify, or repeal rules relating to the location, construction, operation, and maintenance of private sewage disposal systems.

In addition, Iowa Code section 455B.173(11) requires the Commission to adopt rules for the issuance of a single general permit, after notice and opportunity for a public hearing. The single general permit shall cover numerous facilities to the extent that they are representative of a class of facilities which can be identified and conditioned by a single permit. The proposed new chapter will fulfill the Commission's and the Department's requirements pursuant to Iowa Code sections 455B.173(3) and 455B.173(11).

The new Chapter 69 begins with a title change to be consistent with Iowa Code chapter 455B, division III, part 1. Several definitions have also been changed to be consistent with statute. Definitions were added for new technologies. Definitions were removed for terms repeated in NPDES General Permit No. 4 as well as for terms not used in Chapter 69.

Several terminology changes have been made to be consistent with the latest national onsite wastewater standards, the Consortium for Decentralized Wastewater Treatment's glossary of terms, and other Iowa Administrative Code rules.

Provisions have been added for tank abandonment, grease interceptors, and permits by rule. The permit by rule is intended to act as an operation permit for discharging systems that do not require General Permit No. 4. A new rule has been added that pertains to inspection of septic systems at the time of transfer of property. This rule is needed to implement 2008 Iowa Acts, Senate File 261, which modifies Iowa Code section 455B.172 to require that the a property served by a septic system have that system inspected before the sale or transfer of the property is finalized. 2008 Iowa Acts, Senate File 261, also requires the establishment of a certified "time of transfer" inspector program. Requirements for the certified inspector program are included in this new rule.

New provisions have also been added that require a final inspection on a new system installation and that require counties to enter basic information about that system into the state onsite wastewater database system. New Chapter 69 also includes technologies that have been in use but were not included in the current chapter. These technologies include peat filters, textile filters, expanded polystyrene aggregate, filtered pump vaults, and at-grade soil absorption systems. These are all proven technologies in Iowa and nationally. The subrules pertaining to peat moss biofilter systems and recirculating textile filter systems include maintenance requirements since these systems normally are discharging systems.

The requirements for NPDES General Permit No. 4 have been changed. Systems that discharge to designated waters of the state or subsurface drainage tiles will still

require a permit with increased effluent testing and monitoring. Discharging systems that do not discharge to designated waters of the state or subsurface drainage tiles and whose effluent is not expected to reach designated waters of the state or subsurface drainage tiles will not require a General Permit No. 4. However, these systems will require annual inspection and record keeping. The records of the inspections and maintenance must be provided to the administrative authority upon request. This requirement applies to all discharging systems. The permit requirements have been removed from the body of Chapter 69. Discharging system rules refer to General Permit No. 4 for testing and maintenance requirements. A separate rationale for General Permit No. 4 is available from the Department.

Septic tank sizing and lid configurations have been changed. The sizing chart increases each tank's capacity by 250 gallons, eliminating the need for the former requirement to add capacity for appliances that have high water use. The minimum tank capacity will be 1,250 gallons. Most septic tanks in the field will not be affected by this change. Effluent screens will be required in the outlet of septic tanks. These devices prevent suspended solids from leaving the tank and fouling the secondary treatment system. Since effluent screens require regular maintenance, the configuration of openings on the septic tank lid will change to facilitate cleaning of the screens. Another requirement that will make maintenance easier is the requirement that risers on septic tanks come to the ground surface. This change will encourage pumping and maintenance of septic tanks. Tanks and risers will also be required to be watertight.

Soil absorption system sizing charts will now enable users to size systems based on soil loading rates determined from soil analysis. Soil analysis is now the recommended method for determining a soil's capability to accept water. Percolation tests will still be permitted but must be correlated to a soil loading rate for sizing. This change is an educational attempt to slowly move toward soil analysis exclusively in the future. Additional charts have been added to correlate percolation test results and soil loading rates. Sizing charts are given for 2- and 3-foot-wide trenches. The various trench technologies are sized accordingly based upon trench bottom square footage and the type of technology. This method is the nationally accepted method for soil absorption systems.

Provisions for use of a free access sand filter following a septic tank have been removed. Free access sand filters are sized considerably smaller than buried sand filters based upon their ability to be raked and maintained. In practice, the Department has found that these systems do not receive the maintenance needed. Buried sand filters are preferred and can be installed in most cases where a free access sand filter was proposed. There are also other alternatives to free access sand filters. The use of free access sand filters will still be permitted following an aerobic treatment unit since the effluent is of better quality.

Provisions for use of waste stabilization ponds for single-family homes have also been removed. The majority of these systems are not installed according to code requirements and, therefore, do not protect groundwater or the environment. Use of waste stabilization ponds will still be permitted for commercial establishments provided that the ponds are designed by an engineer. Requiring that waste stabilization ponds be professionally designed is intended to improve their construction and maintenance. The rule concerning chemical toilets, which are rarely used in Iowa, has been removed.

A 500-gallon trash tank must now precede an aerobic treatment unit if one is not already incorporated in the unit's design. The aerobic treatment unit must be followed by a free access sand filter or other system at a size prescribed in these rules. Aerobic treatment units are maintenance intensive, and these changes are needed to ensure that the units do not discharge poor quality effluent between service visits or when improperly operated.

The Notice of Intended Action was published in the Iowa Administrative Bulletin on November 05, 2008 as **ARC 7308B**. Comments regarding these amendments were received during the comment period and at three public hearings on December 2, 3, and 4, 2008, in Des Moines, Iowa City and Ft. Dodge respectively. The comments and the Department's response are contained within the responsiveness summary. The following is a summary of changes to Chapter 69:

The time of transfer inspector disciplinary action section, taken from Chapter 82, "Water Well Contractor Certification", was replaced with the more up to date language used in Chapter 81, "Water and Wastewater Operator Certification".

The effective date of time of transfer inspections was added, July 1, 2009, since it will be after the effective date of these rules.

The dates used for continuing education requirements for time of transfer inspectors were slightly modified to coincide with other similar dates used in the Operator Certification database.

Language was added to the continuing education section for time of transfer inspectors to exempt newly certified inspectors from having to earn continuing education credits in a shorter period than two years because of the date newly certified.

Noncompliance with child support language was added to the time of transfer inspector certification requirements.

Changes to the sizing of chambers were removed and the current sizing requirements were retained. Expanded polystyrene aggregate is to be sized similarly.

Chamber sizing requirements were changed to ensure chambers of sufficient height are used to approximate a conventional soil absorption trench.

The definition of drainage ditch was removed.

The definition of expanded polystyrene aggregate was changed to exclude a proprietary manufacturing process.

A soils and vegetative cover section was added to the at-grade soils absorption system section. A requirement to divert surface water was also added.

The phrase "if applicable" was added to each discharging systems section in the effluent sampling subsection to clarify which systems require sampling.

These amendments become effective March 18, 2009.

These amendments are intended to implement Iowa Code chapter 455B, division III, part 1.

The following amendments are adopted.

ITEM 1. Amend subrule 64.15(4) as follows:

64.15(4) "Discharge from Onsite Wastewater Treatment and Disposal Systems," NPDES General Permit No. 4, effective March 18, 2009, to March 17, 2011.

ITEM 2. Rescind 567-- Chapter 69(455B) and adopt the following **new** chapter in lieu thereof:

CHAPTER 69
PRIVATE SEWAGE DISPOSAL SYSTEMS

567—69.1(455B) General.

69.1(1) Applicability. These rules are applicable only to private sewage disposal systems.

69.1(2) Definitions.

"Administrative authority" means the department and the local board of health as authorized by Iowa Code section 455B.172 and Iowa Code chapter 137.

"Aerobic treatment unit" means a disposal system employing bacterial action which is maintained by the utilization of air or oxygen and includes the aeration plant and equipment and the method of final effluent disposal.

"Approved" means accepted or acceptable under an applicable specification stated or cited in these rules or accepted by the administrative authority as suitable for the proposed use.

"Area drain" means a drain installed to collect surface or storm water from an open area of a building or property.

"Building drain" means that part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of any building and conveys the same to the building sewer.

"Building sewer" means that part of the horizontal piping from the building wall to its connection with the main sewer or the primary treatment portion of a private sewage disposal system conveying the drainage of a building site.

"Chamber system" means a buried structure, typically with a domed or arched top, providing at least a 6-inch height of sidewall soil exposure above the invert of the inlet and creating a covered open space above a buried soil infiltrative surface.

"Conventional," when used in reference to sewage treatment, means a soil absorption system involving a series of 2- to 3-foot-wide trenches filled with gravel 1 foot deep, containing a 4-inch-diameter rigid pipe or other alternative trench technologies to convey the sewage effluent.

"Distribution box" means a structure designed to accomplish the equal distribution of wastewater to two or more soil absorption trenches.

"Domestic sewage" or "domestic wastewater" means the water-carried waste products from residences, public buildings, institutions, or other buildings, including bodily discharges from human beings together with groundwater infiltration and surface water as may be present.

"Drip irrigation" means a form of subsurface soil absorption using shallow pressure distribution with low-pressure drip emitters.

"Drop box" means a structure used to divert wastewater flow into a soil absorption trench. When the trench is filled to a set level, the drop box then allows any additional wastewater not absorbed by that trench to flow to the next drop box or soil

absorption trench.

"Dwelling" means any house or place used or intended to be used by humans as a place of residence.

"Expanded polystyrene (EPS) aggregate systems" means cylinders comprised of expanded polystyrene (EPS) synthetic aggregate contained in high-strength polyethylene netting. Cylinders are 12" in diameter and are produced both with and without a distribution pipe. Cylinders may be configured in a trench, bed, at-grade and mound applications to obtain the desired width, height and length. Cylinders containing a distribution pipe shall be connected end-to-end with an internal coupling device.

"Fill soil" means clean soil, free of debris or large organic material, which has been mechanically moved onto a site and has been in place for less than one year.

"Foundation drain" means that portion of a building drainage system which is provided to drain groundwater, not including any wastewater, from the outside of the foundation or over or under the basement floor and which is not connected to the building drain.

"Free access filter" means an intermittent sand filter constructed within the natural soil or above the ground surface, with access to the distributor pipes and top of the filter media for maintenance and media replacement.

"Gravel" means stone screened from river sand or quarried and washed free of clay and clay coatings. Concrete aggregate designated as Class II by the department of transportation is acceptable.

"Gravelless pipe system" means a soil absorption system comprised of 10-inch-diameter corrugated plastic pipe, perforated with holes on a 120-degree arc centered on the bottom, wrapped in a sheath of geotextile filter wrap, and installed level in a trench without gravel bedding or cover.

"Grease interceptor" means a watertight device designed to intercept and retain or remove grease and fatty substances. The device may be located inside (grease separator) or outside (grease tank or grease trap) of a facility.

"Intermittent sand filter" means a bed of granular materials 24 to 36 inches deep underlain by graded gravel and collecting tile. Wastewater is applied intermittently to the surface of the bed through distribution pipes, and the bed is underdrained to collect and discharge the final effluent. Uniform distribution is normally obtained by dosing so as to utilize the entire surface of the bed. Filters may be designed to provide free access (open filters) or may be buried in the ground (buried filters or subsurface sand filters).

"Lake" means a natural or man-made impoundment of water with more than one acre of water surface area at the high water level.

"Limiting layer" means bedrock, seasonally high groundwater level, or any layer of soil with a stabilized percolation rate exceeding 60 minutes for the water to fall one inch.

"Mound system" means an aboveground soil absorption system used to disperse effluent from septic tanks in cases in which a seasonally high water table, high bedrock conditions, slowly permeable soils, or limited land areas prevent conventional subsurface soil absorption systems.

"Packed bed media filter" means a watertight structure filled with uniformly sized media that is normally placed over an underdrain system. The wastewater is dosed onto the surface of the media through a distribution network and is allowed to percolate

through the media to the underdrain system. The underdrain collects the filtrate and discharges the final effluent.

"Percolation test" means a falling water level procedure used to determine the ability of soils to absorb primary treated wastewater. (See Appendix B.)

"Pond" means a natural or man-made impoundment of water with a water surface area of one acre or less at the high water level.

"Pretreated effluent" means septic tank effluent treated through aeration or other methods that, upon laboratory analysis, meets or exceeds a monthly average for biochemical oxygen demand (BOD) of 30 mg/L and total suspended solids (TSS) of 30 mg/L.

"Primary treatment unit" means a unit or system used to separate the floating and settleable solids from the wastewater before the partially treated effluent is discharged for secondary treatment.

"Private sewage disposal system" means a system which provides for the treatment or disposal of domestic sewage from four or fewer dwelling units or the equivalent of less than 16 individuals on a continuing basis. This includes domestic waste, whether residential or nonresidential, but does not include industrial waste of any flow rate.

"Professional soil analysis" means an alternative to the percolation test which depends upon a knowledgeable person evaluating the soil characteristics, such as color, texture, and structure, in order to determine an equivalent percolation or loading rate. A person performing a professional soil analysis shall demonstrate training and experience in soil morphology, such as testing absorption qualities of soil by the physical examination of the soil's color, mottling, texture, structure, topography, and hillslope position.

"Qualified sampler," for the purposes of collecting compliance effluent samples required under NPDES General Permit No.4, means one of the following persons: a city or county environmental health staff person; an Iowa-certified wastewater treatment operator; or an individual who has received training approved by the department to conduct effluent sampling.

"Roof drain" means a drain installed to receive water collecting on the surface of a roof and discharging into an area or storm drain system.

"Secondary treatment system" means a system which provides biological treatment of the effluent from septic tanks or other primary treatment units to meet minimum effluent standards as required in these rules and NPDES General Permit No.4. Examples include soil absorption systems, media filters, aerobic treatment units, or other systems providing equivalent treatment.

"Septage" means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or from a holding tank, when the system is cleaned or maintained.

"Septic tank" means a watertight structure into which wastewater is discharged for solids separation and digestion (referred to as part of the closed portion of the treatment system).

"Sewage sludge" means any solid, semisolid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. "Sewage sludge" includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater

treatment, scum septage, portable toilet pumpings, Type III marine device pumpings as defined in 33 C.F.R. Part 159, and sewage sludge products. "Sewage sludge" does not include grit, screenings, or ash generated during the incineration of sewage sludge.

"Stream" means any watercourse listed as a "designated use segment" in rule 567—61.3(455B) which includes any watercourse that maintains flow throughout the year or contains sufficient pooled areas during intermittent flow periods to maintain a viable aquatic community.

"Subsurface sand filter" means a system in which the effluent from the primary treatment unit is discharged into perforated pipes, filtered through a layer of sand, and collected by lower perforated pipes for discharge to the surface or to a subsurface soil absorption system. A subsurface sand filter is an intermittent sand filter that is placed within the ground and provided with a natural topsoil cover over the crown of the distribution pipes.

"Subsurface soil absorption system" means a system of perforated conduits connected to a distribution system, forming a series of subsurface, water-carrying channels into which the primary treated effluent is discharged for direct absorption into the soil (referred to as part of the open portion of the treatment system).

69.1(3) General regulations.

a. Connections to approved sewer system.

(1) No private sewage disposal system shall be installed, repaired, or rehabilitated where a publicly owned treatment works (POTW) is available or where a local ordinance requires connection to a POTW. The POTW may be considered as not available when such POTW, or any building or any exterior drainage facility connected thereto, is located more than 200 feet from any proposed building or exterior drainage facility on any lot or premises which abuts and is served by such POTW. Final determination of availability shall be made by the administrative authority.

(2) When a POTW becomes available within 200 feet, any building then served by a private sewage disposal system shall be connected to said POTW within a time frame or under conditions set by the administrative authority.

(3) When a POTW is not available, every building wherein persons reside, congregate, or are employed shall be provided with an approved private sewage disposal system.

(4) If a building is to be connected to an existing private sewage disposal system, that existing system shall meet the standards of these rules and be appropriately sized.

b. Discharge restrictions. It is prohibited to discharge any wastewater from private sewage disposal systems (except as permitted in this chapter) to any ditch, stream, pond, lake, natural or artificial waterway, county drain tile, surface water drain tile, or land drain tile, to the groundwater, or to the surface of the ground. Under no conditions shall effluent from private sewage disposal systems be discharged to any abandoned well, agricultural drainage well or sinkhole. Existing discharges to any of the above-listed locations or structures shall be eliminated by the construction of a system in compliance with the requirements of these rules.

c. Construction or alteration. All private sewage disposal systems constructed or altered after March 18, 2009, shall comply with these requirements. Alteration includes any changes that affect the treatment or disposal of the waste. Repair of existing components that does not change the treatment or disposal of the waste is exempt.

However, the discharge restrictions in paragraph “b” above apply.

d. Abandonment. Private sewage disposal systems that are abandoned shall have the septic tank pumped, the tank lid crushed into the tank, and the tank filled with sand or soil.

69.1(4) Construction permit required. No private sewage disposal system shall be installed or altered as described in paragraph 69.1(3)“c” unless a construction permit issued by the administrative authority has been obtained. The installation shall be in accordance with these rules.

69.1(5) Permit by rule. This chapter is intended to act as a permit by rule for private sewage disposal systems. Activities in compliance with this chapter are permitted by the director for purposes of compliance with sections 455B.183 and 455B.186 of the Code of Iowa.

567—69.2(455B) Time of transfer inspections.

69.2(1) Inspections required. Beginning July 1, 2009, prior to any transfer of ownership of a building where a person resides, congregates, or is employed that is served by a private sewage disposal system, the sewage disposal system serving the building shall be inspected. A building that will be demolished without being occupied does not require an inspection. A legally binding document verifying that the building will be demolished shall be provided to the county and to the department for record. In the event that weather or other temporary physical conditions prevent the certified inspection from being conducted, the buyer shall execute and submit a binding acknowledgment with the county board of health to conduct a certified inspection of the private sewage disposal system at the earliest practicable time and to be responsible for any required modifications to the private sewage disposal system as identified by the certified inspection. Title abstracts to property with private sewage disposal systems shall include documentation of compliance with the requirements in this rule.

a. Inspection criteria. If a private sewage disposal system is failing to ensure effective wastewater treatment or is otherwise improperly functioning, the private sewage disposal system shall be renovated to meet current construction standards, as adopted by the department, either by the seller or, by agreement, within a reasonable time period as determined by the county or the department, by the buyer. If the private sewage disposal system is properly treating the wastewater and not creating an unsanitary condition in the environment at the time of inspection, the system is not required to meet current construction standards.

b. Inspection validity. An inspection is valid for a period of two years for any ownership transfers during that period.

69.2(2) Certified time of transfer inspectors. Inspections shall be conducted by an inspector certified by the department. In order to be a certified time of transfer inspector, an individual shall have met the experience requirements, have successfully completed the inspection course and examination, and have been issued a current certificate by the department in accordance with this rule.

a. Experience requirements. In order to be certified by taking the inspection course and examination only, an individual must have at least two years' experience in the operation, installation, inspection, design or maintenance of private sewage disposal systems. Individuals lacking this experience must complete additional coursework before attending the inspection course with testing. The additional courses shall include, but not

be limited to, “Onsite Basics 101” and “Alternative Systems” offered by the Onsite Wastewater Training Center of Iowa or courses determined by the department to be equivalent.

b. Examination application. A person wishing to take the examination necessary to become a certified inspector shall complete the Certified Time of Transfer Inspector Application, Form 542-0192. A listing of dates and locations of examinations is available from the department upon request. The application form requires the applicant to indicate pertinent educational background, training and past experience in providing private sewage disposal services. The completed application and the application fee shall be sent to Time of Transfer Inspector Certification, Iowa Department of Natural Resources, 502 E. 9th St., Des Moines, Iowa 50319-0034. An application for examination must be received by the department at least 60 days prior to the date of the examination.

c. Application evaluation. The director may designate department personnel or an experience review committee to evaluate all applications for examination. A notification of the application review decision will be sent to the applicant prior to the examination date. The applicant shall have the right to dispute the application evaluation.

d. Certification. Applicants who successfully meet the department’s requirements will receive a written certification from the department. The department shall maintain a current listing of certified time of transfer inspectors. The list shall be available on the department’s Web site and shall be provided to county boards of health and other interested parties.

e. Fees. The following nonrefundable fees apply:

(1) Examination fee. The fee for each examination shall be $50.

(2) Certification fee. The fee for inspector certification shall be $75 for each one-half year of a two-year period from the date of issuance of the certification to June 30 of the next even-numbered year.

(3) Certification renewal fee. The fee for certification renewal shall be $300 for the two-year period.

(4) Penalty fee. The penalty fee shall be $100 for each 30 days in delinquency. The penalty fee is for late payment of the initial certification fee or renewal fee or for incomplete application forms.

f. Renewal period. All certificates shall expire on June 30 of even-numbered years and must be renewed every two years in order to maintain certification.

69.2(3) Continuing education.

a. CEU requirements. Continuing education units (CEUs) must be earned during each two-year period from April 1 of the even-numbered year until March 30 of the next even-numbered year. A certified inspector must earn 1.2 CEUs or 12 contact hours during each two-year period. Newly certified time of transfer inspectors (previously uncertified) who become certified after April 1 of a two-year period will not be required to earn CEU’s until the next two-year period.

b. CEU approval. All activities for which CEU credit will be granted must be approved by an accredited college or university, an issuing agency, or the department and shall be related to private sewage disposal systems.

c. CEU reporting. It is the personal responsibility of the certified inspector to maintain a written record of and to notify the department of the CEUs earned during the period. The CEUs earned during the period shall be shown on the application for renewal.

69.2(4) Certificate renewal.

a. Certification period. All certificates shall expire on June 30 of even-numbered years and must be renewed every two years in order to stay effective.

b. Application for renewal. Renewal applications shall be submitted on DNR Form 542-0192 60 days before the expiration date of the current certificate. Late applications or incomplete applications may lead to revocation of the certificate. Renewal of certificates will only be granted to inspectors in good standing.

c. CEUs. Only those certified inspectors fulfilling the continuing education requirements before the end of each two-year period (June 30) will be allowed to renew their certificates. The certificates of inspectors not fulfilling the continuing education requirements shall expire on June 30 of the even-numbered year.

d. Renewal fee. A renewal fee in the amount of $300 must accompany the renewal application in order for the inspector to renew the certificate. Failure to submit the renewal fee on time may lead to revocation of the certificate.

69.2(5) Obligations of certified inspectors.

a. Certified inspectors shall conduct time of transfer inspections according to this rule.

b. Following an inspection, the inspection form and any related reports shall be provided to the county environmental health department for enforcement of any follow-up mandatory improvements to the system, to the department for record, and to the county recorder's office.

69.2(6) Disciplinary actions.

a. Reasons for disciplinary action. Disciplinary action may be taken against a certified time of transfer inspector on any of the grounds specified in Iowa Code section 455B.219 and the following more specific grounds.

(1) Failure to use reasonable care or judgment or to apply knowledge or ability in performing the duties of a certified time of transfer inspector.

(2) Failure to submit required records of inspection or other reports required under applicable permits or rules of the department, including failure to submit complete records or reports.

(3) Knowingly making any false statement, representation, or certification on any application, record, report or document required to be maintained or submitted under any applicable permit or rule of the department.

(4) Fraud in procuring a license.

(5) Professional incompetence.

(6) Knowingly making misleading, deceptive, untrue or fraudulent representations in the practice of the licensee's profession or engaging in unethical conduct or practice harmful or detrimental to the public. Proof of actual injury need not be established.

(7) Habitual intoxication or addiction to the use of drugs.

(8) Conviction of a felony related to the profession or occupation of the licensee. A copy of the record of conviction or plea of guilty shall be conclusive evidence.

(9) Fraud in representations as to skill or ability.

(10) Use of untruthful or improbable statements in advertisements.

(11) Willful or repeated violations of the provisions of 455B, division III.

b. Disciplinary sanctions. Disciplinary sanctions may include the following:

(1) Revocation of a certificate. Revocation may be permanent without chance of

recertification or for a specified period of time.

(2) Partial revocation or suspension. Revocation or suspension of the practice of a particular aspect of the inspection of private sewage disposal systems.

(3) Probation. Probation under specified conditions relevant to the specific grounds for disciplinary action.

(4) Additional education, training, and examination requirements. Additional education, training, and reexamination may be required as a condition of reinstatement.

(5) Penalties. Civil penalties not to exceed $1,000 may be assessed for causes identified in 69.2(6)“a” through the issuance of an Administrative Order.

c. Procedure.

(1) Initiation of disciplinary action. The department staff shall initiate a disciplinary action by conducting such lawful investigation as is necessary to establish a legal and factual basis for action. Written notice shall be given to a certified inspector against whom disciplinary action is being considered. The notice shall provide the certified inspector with 20 days to present any relevant facts and to indicate the certified inspector’s position in the matter.

(2) A certified inspector’s failure to communicate facts and positions relevant to the disciplinary investigation by the required date may be considered when determining appropriate disciplinary action.

(3) If an agreement as to appropriate disciplinary action, if any, can be reached between the Department and the certified inspector, a written stipulation and settlement shall be entered into. The stipulation and settlement shall recite the basic facts and violations alleged, any facts established by the operator, and the reasons for the particular sanction imposed.

(4) If an agreement as to appropriate disciplinary action can not be reached, the department may initiate formal contested case procedures through the issuance of a letter imposing such disciplinary sanctions as the Department has deemed appropriate. Service shall be provided by certified mail.

(5) A certified inspector may appeal any disciplinary sanction imposed by the Department by filing a notice of appeal with the Director within 30 days of receipt of notice. If an appeal is filed by the certified inspector, contested case proceedings shall be initiated by the Department in accordance with 567—Chapter 7 and Chapter 17A of the Code of Iowa.

(6) Reinstatement of revoked certificates. Upon revocation of a certificate, application for certification may be allowed after two years from the date of revocation unless otherwise specified in accordance with 69.2(6)b. Any such applicant must meet all education and experience eligibility requirements pursuant to 69.2(2)(455B), and successfully complete an examination and be certified in the same manner as a new applicant.

69.2(7) Noncompliance with child support order procedures. Upon receipt of a certification of noncompliance with a child support obligation as provided in Iowa Code section 252J.7, the department will initiate procedures to deny an application for certification or renewal, or to suspend a certification in accordance with Iowa Code section 252J.8(4). The department shall issue to the person by restricted certified mail a notice of its intent to deny or suspend time of transfer inspector certification based on receipt of a certificate of noncompliance. The suspension or denial shall be effective 30

days after receipt of the notice unless the person provides the department with a withdrawal of the certificate of noncompliance from the child support recovery unit as provided in Iowa Code section 252J.8(4)"c." Pursuant to Iowa Code section 252J.8(4), the person does not have a right to a hearing before the department to contest the denial or suspension action under this subrule but may seek a hearing in district court in accordance with Iowa Code section 252J.9.

69.2(8) Inspection procedures. Inspections shall be conducted as follows:

a. Inspection form. The inspection shall be conducted using DNR Form 542-0191, Time of Transfer Inspection Report.

b. Record search. Prior to an inspection, the certified inspector shall contact the administrative authority to obtain any permits, as-built drawings or other information that may be available concerning the system being inspected. Information may also be obtained from service providers or the homeowner. If an as-built drawing is available, the system inspection shall verify that drawing. If no as-built drawing is available, the inspector shall develop an as-built drawing as part of the inspection.

c. Septic tank. At the time of inspection, any septic tank(s) existing as part of the sewage disposal system shall be opened and have the contents pumped out and disposed of according to 567—Chapter 68. In the alternative, the owner may provide evidence of the septic tank being properly pumped out within three years prior to the inspection by a commercial septic tank cleaner licensed by the department which shall include documentation of the size and condition of the tank and its components at the time of such occurrence. If the septic tank(s) is opened, the condition of the tank and its components shall be documented and included in the final report.

d. Pumps and pump chambers. Pump chambers or vaults shall be opened for inspection, and the pump shall be tested to ensure proper operation.

e. Secondary treatment. Proof that a secondary treatment system is in place must be provided. This proof may include, but is not limited to:

(1) Opening a distribution box or uncovering a header pipe for a soil absorption system. Existing distribution boxes shall be opened for inspection.

(2) Verification of the existence of a sand filter by locating the vents and discharge pipe.

(3) Locating and opening the lid(s) of an advanced treatment unit.

(4) Absorption fields shall be probed to determine their condition. The condition of the fields shall be noted on the inspection report. The condition of the absorption field may also be determined with a hydraulic loading test.

f. Discharging systems. An effluent test shall be performed on any legally discharging private sewage disposal system. The effluent shall be tested to determine if it meets the requirements of the NPDES General Permit No.4, and the test results shall be included in the inspection report.

(1) The certified inspector shall ensure that a legally discharging private sewage disposal system has an NPDES General Permit No.4, if applicable.

(2) The certified inspector shall ensure that a Notice of Intent to discharge is submitted to the department for coverage under the NPDES General Permit No.4.

g. Packaged treatment units. An advanced treatment unit, such as an aerobic treatment unit, textile filter, peat filter or fixed activated sludge treatment system, shall be inspected according to the manufacturer's recommendations.

h. Other systems and system components. Private sewage disposal systems not mentioned above shall be inspected for code compliance, and an effluent sample shall be taken if applicable. Any components of the private sewage disposal system not mentioned above shall be inspected for proper function. Examples of other components include, but are not limited to, effluent screens, tertiary treatment systems, disinfection devices, alarms, control boxes and timers.

i. Inspection reports. Following an inspection, the inspection form and a narrative report describing the condition of the private sewage disposal system at the time of the inspection shall be provided to the county, to the department for record, and to the county recorder in the county where the inspection occurred.

567—69.3(455B) Site analysis.

69.3(1) Site evaluation. A site evaluation shall be conducted prior to issuance of a construction permit. Consideration shall be given to, but not be limited to, the impact of the following: topography; drainage ways; terraces; floodplain; percent of land slope; location of property lines; location of easements; buried utilities; existing and proposed tile lines; existing, proposed and abandoned water wells; amount of available area for the installation of the system; evidence of unstable ground; alteration (cutting, filling, compacting) of existing soil profile; and soil characteristics determined from a soil analysis, percolation tests, and soil survey maps if available.

a. Soil survey reports. During a site analysis and investigation, maximum use should be made of soil survey reports, which are available from USDA Natural Resources Conservation Service. A general identification of the percolation potential can be made from soil map units in Iowa. Verification of the soil permeability of the specific site must be performed.

b. Final inspections. All newly constructed private sewage disposal systems shall be inspected by the administrative authority before the system is backfilled or at a time prescribed by the administrative authority. A final as-built drawing shall be made as part of the final inspection.

c. Onsite wastewater tracking system. All pertinent information, including but not limited to, the site address, owner, type, date of installation, and as-built drawing of the private sewage disposal system shall be entered into the department's Web-based onsite wastewater tracking system.

69.3(2) Minimum distances. All private sewage disposal systems shall be located in accordance with the minimum distances shown in Table I.

Table I

Minimum Distance in Feet From	Closed Portion of Treatment System(1)	Open Portion of Treatment System(2)
Private water supply well	50	100
Public water supply well	200	200
Groundwater heat pump borehole	50	100
Lake or reservoir	50	100
Stream or pond	25	25

Edge of drainage ditch	10	10
Dwelling or other structure	10	10
Property lines (unless a mutual easement is signed and recorded)	10	10
Other type of subsurface treatment system	5	10
Water lines continually under pressure	10	10
Suction water lines	50	100
Foundation drains or subsurface tiles	10	10

[(1)]Includes septic tanks, aerobic treatment units, fully contained media filters and impervious vault toilets
[(2)]Includes subsurface absorption systems, mound systems, intermittent sand filters, constructed wetlands, open bottom media filters and waste stabilization ponds.

567—69.4(455B) Requirements when effluent is discharged into surface water. All discharges from private sewage disposal systems which are discharged into, or have the potential to reach, any designated waters of the state or subsurface drainage tile shall be treated in a manner that will conform with the requirements of NPDES General Permit No. 4 issued by the department of natural resources, as referenced in 567—Chapter 64. Prior to the use of any system discharging to designated waters of the state or a subsurface drainage tile, a Notice of Intent to be covered by NPDES General Permit No. 4 shall be submitted to the department. Systems covered by this permit must meet all applicable requirements listed in the permit, including effluent sampling and monitoring.

567—69.5(455B) Requirements when effluent is discharged above the ground surface.

69.5(1) All private sewage disposal systems that discharge above the ground surface shall be annually inspected to ensure proper operation.

69.5(2) Private sewage disposal systems that require a maintenance contract shall be inspected by a manufacturer's certified technician or person demonstrating knowledge of the system in accordance with the manufacturer's standards.

69.5(3) Private sewage disposal systems that do not require a maintenance contract shall be visually inspected by a person with knowledge of the system for any malfunction and shall have the septic tank opened, inspected, and pumped if needed. A record of the inspection and any tank pumping shall be maintained and be made available to the administrative authority upon request.

567—69.6(455B) Requirements when effluent is discharged into the soil. No septage or wastewater shall be discharged into the soil except in compliance with the requirements contained in these rules.

567—69.7(455B) Building sewers.

69.7(1) Location and construction.

a. The types of construction and distances as shown in Table II shall be maintained for the protection of water supplies. The distances shall be considered minimum distances and shall be increased where possible to provide better protection.

TABLE II

Sewer Construction	Distance from Well Water Supply	
	Private	Public
1. Schedule 40 plastic pipe (or SDR 26 or stronger) with approved type joints or cast–iron soil pipe (extra heavy or centrifugally cast) with joints of preformed gaskets.	10	25
2. Sewer pipe installed to remain watertight and root–proof.	50	75

b. Under no circumstances shall a well suction line pass under a building sewer line.

69.7(2) Requirements for building sewers.

a. Type. Building sewers used to conduct wastewater from a building to the primary treatment unit of a private sewage disposal system shall be constructed of Schedule 40 plastic pipe (or SDR 26 or stronger) with solvent-weld or bell-and-gasket-type joints or shall be constructed of cast iron with integral bell-and-gasket-type joints.

b. Size. Such building sewers shall not be less than 4 inches in diameter.

c. Grade. Such building sewers shall be laid to the following minimum grades:

4-inch sewer ..... 12 inches per 100 feet

6-inch sewer ..... 8 inches per 100 feet

69.7(3) Cleanouts.

a. Spacing. A cleanout shall be provided where the building sewer leaves the house and at least every 100 feet downstream to allow for rodding.

b. Change of direction or grade. An accessible cleanout shall be provided at each change of direction or grade if the change exceeds 45 degrees.

69.7(4) Grease interceptors.

a. Applicability. Grease interceptors shall be provided for kitchen flows at restaurants, nursing homes, schools, hospitals and other facilities from which grease can be expected to be discharged.

b. Installation. Grease interceptors shall be installed on a separate building sewer serving kitchen flows into which the grease will be discharged. The discharge from the grease interceptor must flow to a properly designed septic tank or to a building sewer and then to the septic tank.

567—69.8(455B) Primary treatment—septic tanks.

69.8(1) General requirements.

a. Septic tank required. Every private sewage disposal system shall have as a primary treatment unit a septic tank as described in this rule. All wastewater from the facility serviced shall discharge into the septic tank (except as noted in paragraph “d” below).

b. Easements. No septic tank shall be located upon property under ownership different from the ownership of that property or lot upon which the wastewater originates unless easements to that effect are legally recorded and approved by the proper administrative authority.

c. Effluent discharge requirements. All septic tank effluent shall discharge into a secondary treatment system in compliance with this chapter or into another system approved by the administrative authority according to rule 69.21(455B).

d. Prohibited wastes. Septic tanks shall not be used for the disposal of chemical wastes or grease in quantities which might be detrimental to the bacterial action in the tank or for the disposal of drainage from roof drains, foundation drains, or area drains.

69.8(2) Capacity.

a. Minimum capacity. The minimum liquid-holding capacity shall be as specified in the following table (capacity may be obtained by using one or more tanks):

Up to and including 3-bedroom homes	1,250 gal.
4-bedroom homes	1,500 gal.
5-bedroom homes	1,750 gal.
6-bedroom homes	2,000 gal.

b. Other domestic waste systems. In the event that an installation serves more than a 6-bedroom home or its equivalent, or serves a facility other than a house and serves the equivalent of fewer than 16 individuals on a continuing basis, approval of septic tank capacity and design must be obtained from the administrative authority. Minimum septic tank liquid-holding volume shall be two times the estimated daily sewage flow.

c. Determination of flow rates. For wastewater flow rates for nonresidential and commercial domestic waste applications serving the equivalent of fewer than 16 individuals on a continuing basis, refer to Appendix A.

d. Minimum depth. The minimum liquid-holding depth in any compartment shall be 40 inches.

e. Maximum depth. The maximum liquid-holding depth for calculating capacity of the tank shall not exceed 6½ feet.

f. Dimensions. The interior length of a septic tank should not be less than 5 feet and shall be at least 1½ times the width (larger length-to-width ratios are preferred). No tank or compartment shall have an inside width of less than 2 feet. The minimum inside diameter of a vertical cylindrical septic tank shall be 5 feet.

69.8(3) Construction details.

a. Fill soil. Any septic tank placed in fill soil shall be placed upon a level, stable base that will not settle.

b. Compartmentalization. Every septic tank shall be divided into two compartments as follows (compartmentalization may be obtained by using more than one tank):

(1) The capacity of the influent compartment shall not be less than one-half nor more than two-thirds of the total tank capacity.

(2) The capacity of the effluent compartment shall not be less than one-third nor more than one-half of the total tank capacity.

c. Inlet/outlet. The invert of the inlet pipe shall be a minimum of 2 inches and a maximum of 4 inches higher than the invert of the outlet pipe.

d. Baffles.

(1) Four-inch-diameter Schedule 40 plastic pipe tees shall be used as inlet and

outlet baffles. Inlet tees shall extend at least 6 inches above and 8 inches below the liquid level of the tank. The inlet tee shall extend below the liquid level no more than 20 percent of the liquid depth. The outlet tee shall extend above the liquid level a distance of at least 6 inches and below the liquid level a distance of at least 15 inches but no more than 30 percent of the liquid depth. A minimum 2-inch clearance between the top of the inlet and outlet tees and the bottom of the tank lid shall be provided. A horizontal separation of at least 36 inches shall be provided between the inlet baffle and the outlet baffle in each compartment. Outlet baffles shall be fitted with an effluent screen. All effluent screens shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 46, including appendices, or other equivalent testing as determined by the department. Effluent screens require periodic inspection and cleaning to ensure their continued proper operation.

(2) A horizontal slot 4 inches by 6 inches, or two suitably spaced 4-inch-diameter holes in the tank partition, may be used instead of a tee or baffle. The top of the slot or holes shall be located below the water level a distance of one-third the liquid depth. A ventilation hole or slot, located at least 8 inches above the liquid level, shall be provided in the partition.

e. Access.

(1) Access necessary for adequate inspection, operation, and maintenance must be provided to all parts of septic tanks.

(2) An access opening shall be provided at each end of the tank over the inlet and outlet. These openings shall be at least 18 inches in the smallest dimension.

(3) Watertight risers shall be installed to bring the access openings to the ground surface. Risers shall be secured using stainless steel fasteners of sufficient complexity, locking devices, concrete lids of sufficient weight, or another device approved by the administrative authority to deter tampering.

69.8(4) Construction.

a. Materials. Tanks shall be constructed of watertight poured concrete, fiberglass or plastic resistant to corrosion or decay and shall be designed so that the tanks, whether full or empty, will not collapse or rupture when subjected to anticipated earth and hydrostatic pressures. Metal tanks are prohibited.

b. Watertight tanks. Tanks shall be watertight. Prior to approving a tank, the administrative authority may ask for proof that a tank is watertight.

c. Dividers. Tank divider walls and divider wall supports shall be constructed of heavy, durable plastic, fiberglass, concrete or other similar corrosion-resistant materials approved by the administrative authority.

d. Inlet and outlet ports. Inlet and outlet ports of pipe shall be constructed of heavy, durable Schedule 40 PVC plastic sanitary tees or other similar approved corrosion-resistant material.

69.8(5) Wall thickness. Minimum wall thickness for tanks shall conform to the following specifications:

Poured concrete	6 inches thick
Poured concrete, reinforced	4 inches thick
Special concrete mix, vibrated and reinforced	2.5 inches thick

Fiberglass or plastic	.25 inches thick

69.8(6) Concrete specifications. Concrete used in precast septic tank construction shall have a maximum water-to-cement ratio of 0.45. Cement content shall be at least 650 pounds per cubic yard. Minimum compressive strength (f'_c) shall be 4,000 psi (28 Mpa) at 28 days of age. The use of ASTM C150 Type II cement or the addition of silica fume or Class F fly ash is recommended.

69.8(7) Tank bottoms. Septic tank bottoms shall conform to the specifications set forth in subrule 69.8(5) for septic tank walls, except that special mix concrete shall be at least 3 inches thick.

69.8(8) Tank tops. Concrete or masonry septic tank tops shall be a minimum of 4 inches in thickness and shall be reinforced with ⅜-inch reinforcing rods in a 6-inch grid or equivalent. Fiberglass or plastic tank tops shall be a minimum of ¼ inch in thickness and shall have reinforcing and be of ribbed construction.

69.8(9) Reinforcing steel placement. The concrete cover for reinforcing bars, mats, or fabric shall not be less than 1 inch.

69.8(10) Bedding. Fiberglass or plastic tanks shall be bedded according to the manufacturer's specifications. Provisions should be made to prevent flotation of the tanks when they are empty.

69.8(11) Connecting pipes.

a. Minimum diameter. The pipes connecting septic tanks installed in series and at least the first 5 feet of pipe on the effluent side of the last tank shall be a minimum of 4-inch-diameter Schedule 40 plastic.

b. Tank connections. All inlet and outlet connections at the septic tanks shall be made by self-sealing gaskets cast into the concrete or formed into the plastic or fiberglass.

c. Joints. All joints in connecting Schedule 40 plastic pipe shall be approved plastic pipe connections such as solvent-welded or compression-type gaskets.

d. Pipe in unstable ground. Schedule 40 plastic pipe shall be used extending across excavations or unstable ground to at least 2 feet beyond the point where the original ground has not been disturbed in septic tank installations. If the excavation spanned is more than 2 feet wide, it must be filled with sand or compacted fill to provide a firm bed for the pipe. The first 12 inches of backfill over the pipe shall be applied in thin layers, using material free from stones, boulders, large frozen chunks of earth or any similar material that would damage or break the pipe.

567—69.9(455B) Secondary treatment—subsurface soil absorption systems. Subsurface soil absorption systems are the best available treatment technology and shall always be used where possible.

69.9(1) General requirements.

a. Locations. All subsurface soil absorption systems shall be located on the property to maximize the vertical separation distance from the bottom of the absorption trench to the seasonal high groundwater level, bedrock, hardpan or other confining layer, but under no circumstances shall this vertical separation be less than 3 feet.

b. Soil evaluation. A percolation test or professional soil analysis is required before any soil absorption system is installed.

(1) Percolation test. The percolation test procedure is outlined in Appendix B.

(2) Alternative analysis. If a professional soil analysis is performed, soil characteristics such as soil content, color, texture, and structure shall be used to determine a loading rate.

(3) Acceptable percolation rate. An area is deemed suitable for conventional soil absorption if the average percolation rate is 60 minutes per inch or less and greater than 1 minute per inch. However, if an alternative soil absorption system is proposed (e.g., mound system), then the percolation test should be extended to determine whether a percolation rate of 120 minutes per inch is achieved.

(4) Confining layer determination. An additional test hole 6 feet in depth or to rock, whichever occurs first, shall be provided in the center of the proposed absorption area to determine the location of groundwater, rock formations or other confining layers. This 6-foot test hole may be augered the same size as the percolation test holes or may be made with a soil probe.

c. Groundwater. If the seasonal high groundwater level is present within 3 feet of the trench bottom final grade and cannot be successfully lowered by subsurface tile drainage, the area shall be classified as unsuitable for the installation of a standard subsurface soil absorption system. Consult the administrative authority for an acceptable alternative method of wastewater treatment.

d. Site limitations. In situations where specific location or site characteristics would appear to prohibit installation of a soil absorption system, design modifications which could overcome such limitations may be approved by the administrative authority. Examples of such modifications could be the installation of subsurface drainage, use of shallow or at-grade trenches, drip irrigation, or mound systems or use of pretreated effluent.

e. Prohibited drainage. Roof, foundation and storm drains shall not discharge into or upon subsurface absorption systems. Nothing shall enter the subsurface absorption system which does not first pass through the septic tank.

f. Prohibited construction. There shall be no construction of any kind, including driveways, covering the septic tank, distribution box or absorption field of a private sewage disposal system. Vehicle access should be infrequent, primarily limited to vegetation maintenance.

g. Driveway crossings. Connecting lines under driveways shall be constructed of Schedule 40 plastic pipe or equivalent and shall be protected from freezing.

h. Easements. No wastewater shall be discharged upon any property under ownership different from the ownership of the property or lot upon which the wastewater originates unless easements to that effect are legally recorded and approved by the administrative authority.

69.9(2) Sizing requirements.

a. Percolation and soil loading charts. Table IIIa provides a correlation between percolation rates and soil loading rates. Table IIIb provides soil loading rates based upon soil texture and structure. Use Table IIIa and Table IIIb to determine the appropriate soil loading rate. Table IIIc specifies linear feet of lateral trenches required based upon the soil loading rate, wastewater flow rate, and trench width. Table IIId provides a method to determine the size of an absorption bed. Absorption beds (Table IIId) shall not be used except when the lot size limitations preclude the installation of a lateral trench system.

Further details concerning limitations of this alternative shall be obtained from the administrative authority before authorization for installation is requested.

b. Unsuitable absorption. Conventional subsurface soil absorption trenches shall not be installed in soils that have a percolation rate less than 1 minute per inch or greater than 60 minutes per inch. Plans for an alternative method of wastewater treatment shall be submitted to the administrative authority for approval prior to construction.

Table IIIa

Maximum Soil Application Rates Based Upon Percolation Rates

Percolation Rate (minutes per inch)	Monthly Averages Septic tank effluent[1] BOD_5 30mg/L - 220mg/L TSS 30mg/L - 150 mg/L (gals/sq ft/day)[2]	Pre-treated effluent BOD_5 ≤30 mg/L TSS ≤30 mg/L (gals/sq ft/day)
0 to 5	1.2	1.6
Fine sands	0.5	0.9
6 to 10	0.8 – 0.6	1.2
11 to 29	0.6 – 0.5	0.9
30 to 45	0.5 – 0.4	0.7
46 to 60	0.4 – 0.2	0.5
61 to 120	0.0	0.3
greater than 120	0.0	0.0

Note: BOD means biochemical oxygen demand
TSS means total suspended solids

(1) Typical waste strengths for domestic waste. Higher strength waste should consider pre-treatment.

(2) Percolation rates and soil loading rates do not precisely correlate therefore a range is provided.

Table IIIb

Maximum soil loading rates based upon soil evaluations in gallons per square foot (gal/ft^2/day) for septic tank effluent. Values in ( ) are for secondary treated effluent.

Soil Texture	Single Grain	Massive	Structure Granular, Blocky, or Prismatic			Platy	
			weak	moderate	strong	weak	moderate strong
Coarse Sand and Gravel	1.2 (1.6)	x	1.2 (1.6)	x	x	1.2 (1.6)	X
Medium sands	0.7 (1.4)	x	0.7 (1.4)	x	x	0.7 (1.4)	X
Fine sands	0.5 (0.9)	x	0.5 (0.9)	x	x	0.5 (0.9)	X
Very fine sands*	0.3 (0.5)	x	0.3 (0.5)	x	x	0.3 (0.5)	X
Sandy Loam	X	0.3 (0.5)	0.45 (0.7)	0.6 (1.1)	0.65 (1.2)	0.4 (0.6)	0.3 (0.5)
Loam	X	0.4 (0.6)	0.45 (0.7)	0.5 (0.8)	0.55 (0.8)	0.4 (0.6)	0.3 (0.5)
Silty loam	X	NS	0.4	0.5	0.5	0.3	0.2

			(0.6)	(0.8)	(0.8)	(0.5)	(0.3)
Clay loam	X	NS	0.2 (0.3)	0.45 (0.7)	0.45 (0.7)	0.1 (0.2)	0.1 (0.2)
Silty clay loam	X	NS	0.2 (0.3)	0.45 (0.7)	0.45 (0.7)	NS	NS

"X" - not found in nature
NS - not suitable for soil absorption
* some very fines sands are difficult to determine flow rates and experience may provide better information and flow rates.

Table IIIc
Length of absorption trenches in feet

	2 bedroom 300 gal.		3 bedroom 450 gal.		4 bedroom 600 gal.		5 bedroom 750 gal.		6 bedroom 900 gal.	
Width of trench in feet	2'	3'	2'	3'	2'	3'	2'	3'	2'	3'
Soil loading rate gal/ft^2										
0.1	Not suitable for soil absorption trenches									
0.2	750	500	1125*	750	1500*	1000*	1875*	1250*	2250*	1500*
0.3	500	333	750	500	1000*	666	1250*	833*	1500*	1000*
0.4	375	250	562	375	750	500	938*	625	1125*	750
0.5	300	200	450	300	600	400	750	500	900*	600
0.6	250	167	375	250	500	333	625	417	750	500
0.7	214	143	321	214	428	286	536	357	643	429
0.8	188	125	281	188	375	250	469	312	562	375
0.9	167	111	250	167	333	222	417	278	500	333
1.0	150	100	250	150	300	200	375	250	450	300
1.1	136	91	205	136	273	182	341	227	409	273
1.2	125	84	188	125	250	167	313	208	375	250

NS - Not suitable for laterals
* Requires pressure distribution (pump)

Table IIId
Alternative Option for Use of Absorption Bed[(1)]

Percolation Rate Min./Inch	Absorption Area/Bedroom Sq. Ft.	Loading Rate/Day Gal./Sq. Ft.
1–5	300	.5
6–15	400	.375
16–30	600	.25

[(1)]Absorption beds may only be used when site space restrictions require and shall not be used when the soil percolation rate exceeds 30 min./inch.

69.9(3) Construction details for all soil absorption trenches.

a. Depth. Soil absorption trenches shall not exceed 36 inches in depth unless authorized by the administrative authority, but a shallower trench bottom depth of 18 to 24 inches is recommended. Not less than 6 inches of porous soil shall be provided over the laterals. The minimum separation between trench bottom and groundwater, rock formation or other confining layers shall be 36 inches even if extra rock is used under the pipe.

b. Length. No soil absorption trench shall be greater than 100 feet long.

c. Separation distance. At least 6 feet of undisturbed soil shall be left between each trench edge on level sites. The steeper the slope of the ground, the greater the separation distance should be. Two feet of separation distance should be added for each 5 percent increase in slope from level.

d. Grade. The trench bottom should be constructed level from end to end. On sloping ground, the trench shall follow a uniform land contour to maintain a minimum soil cover of 6 inches and a level trench bottom.

e. Compaction. There shall be minimum use or traffic of heavy equipment on the area proposed for soil absorption. In addition, it is prohibited to use heavy equipment on the bottom of the trenches in the absorption area.

f. Fill soil. Soil absorption systems shall not be installed in fill soil. Disturbed soils which have stabilized for at least one year shall require a recent percolation test or soil analysis.

g. Bearing strength. Soil absorption systems shall be designed to carry loadings to meet AASHTO H-10 standards.

h. Soil smearing. Soils with significant clay content should not be worked when wet. If soil moisture causes sidewall smearing, the installation should be discontinued until conditions improve.

69.9(4) Gravel systems.

a. Gravel. A minimum of 6 inches of clean, washed river gravel, free of clay and clay coatings, shall be laid below the distribution pipe, and enough gravel shall be used to cover the pipe. This gravel shall be of such a size that 100 percent of the gravel will pass a 2½-inch screen and 100 percent will be retained on a ¾-inch screen. Limestone or crushed rock is not recommended for soil absorption systems; however, if used, it shall meet the following criteria:

(1) Abrasion loss. The percent wear, as determined in accordance with the AASHTO T 96, Grading C, shall not exceed 40 percent.

(2) Freeze and thaw loss. When gravel is subjected to the freezing and thawing test, Iowa DOT Materials Laboratory Test Method 211, Method A, the percentage loss shall not exceed 10 percent.

(3) Absorption. The percent absorption, determined in accordance with Iowa DOT Materials Laboratory Test Method 202, shall not exceed 3 percent.

b. Trench width. Soil absorption trenches for gravel systems shall be a minimum of 24 inches and a maximum of 36 inches in width at the bottom of the trench.

c. Grade. The distribution pipes shall be laid with a minimum grade of 2 inches per 100 feet of run and a maximum grade of 6 inches per 100 feet of run, with a preference given to the lesser slope.

d. Pipe. Distribution pipe shall be PVC rigid plastic meeting ASTM Standard

2729 or other suitable material approved by the administrative authority. The inside diameter shall be not less than 4 inches, with perforations at least ½ inch and no more than ¾ inch in diameter, spaced no more than 40 inches apart. Two rows of perforations shall be provided located 120 degrees apart along the bottom half of the tubing (each 60 degrees up from the bottom centerline). The end of the pipe in each trench shall be sealed with a watertight cap unless, on a level site, a footer is installed connecting the trenches together. Coiled perforated plastic pipe shall not be used.

e. Gravel cover. Unbacked, rolled, 3½-inch-thick fiberglass insulation, untreated building paper, synthetic drainage fabric, or other approved material shall be laid so as to separate the gravel from the soil backfill.

69.9(5) Gravelless pipe systems.

a. Application. Gravelless subsurface soil absorption systems may be used as an alternative to conventional 4-inch pipe placed in gravel-filled trenches. However, these systems cannot be used in areas where conventional systems would not be allowed due to poor permeability, high groundwater, or insufficient depth to bedrock.

b. Installation. The manufacturer's specifications and installation procedures shall be adhered to.

c. Material. The 10-inch I.D. corrugated polyethylene tubing used in gravelless systems shall meet the requirements of ASTM F667, Standard Specification for Large Diameter Corrugated Polyethylene Tubing.

d. Perforations. Two rows of perforations shall be located 120 degrees apart along the bottom half of the tubing (each 60 degrees up from the bottom centerline). Perforations shall be cleanly cut into each inner corrugation along the length of the tubing and should be staggered so that there is only one hole in each corrugation.

e. Top marking. The tubing should be visibly marked to indicate the top of the pipe.

f. Filter wrap. All gravelless drainfield pipe shall be encased, at the point of manufacture, with a geotextile filter wrap specific to this purpose.

g. Trench width. The trench width for the gravelless system shall be 24 inches.

h. Length of trench. The total length of absorption trench for a 10-inch gravelless pipe installation shall be the same as given in Table IIIc for a 2 foot wide conventional soil absorption trench.

69.9(6) Chamber systems.

a. Application. Chamber systems may be used as an alternative to conventional 4-inch pipe placed in gravel-filled trenches. However, the chamber systems cannot be used in areas where conventional systems would not be allowed due to poor permeability, high groundwater, or insufficient depth to bedrock.

b. Installation. The manufacturer's specifications and installation procedures shall be adhered to.

c. Length of trench. The total length of soil absorption trench for chambers 15 to 22 inches wide shall be the same as given in Table IIIc for a two-foot wide conventional soil absorption trench. Chambers 33 inches wide or greater shall be sized as given in Table IIIc for a three-foot wide conventional soil absorption trench.

d. Sidewall. The chambers shall have at least 6 inches of sidewall effluent soil exposure height above the invert of the inlet.

69.9(7) Expanded polystyrene (EPS) aggregate system.

a. Application. EPS aggregate systems may be used as an alternative to conventional 4-inch pipe placed in gravel-filled trenches. However, EPS aggregate systems cannot be used in areas where conventional systems would not be allowed due to poor permeability, high groundwater, or insufficient depth to bedrock.

b. Installation. The manufacturer's specifications and installation procedures shall be adhered to.

c. Length of trench. The total length of soil absorption trench for 12 inch EPS aggregate bundles shall be the same as given in Table IIIc for a two foot wide convention soil absorption trench. Twelve- inch EPS aggregate bundles 33 inches wide or greater shall be sized as given in Table IIIc for a three-foot wide conventional soil absorption trench.

d. Gravel cover. Unbacked, rolled, 3½-inch-thick fiberglass insulation, untreated building paper, synthetic drainage fabric, or other approved material shall be laid so as to separate the EPS aggregate from the soil backfill.

69.9(8) Gravity distribution. Dosing is always recommended and preferred to improve distribution, improve treatment and extend the life of the system.

a. On a hillside, septic tank effluent may be serially loaded to the soil absorption trenches by drop boxes or overflow piping (rigid sewer pipe). Otherwise, effluent shall be distributed evenly to all trenches by use of a distribution box or commercial distribution regulator approved by the administrative authority.

b. Design. When a distribution box is used, it shall be of proper design and installed with separate watertight headers leading from the distribution box to each lateral. Header pipes shall be rigid PVC plastic pipe meeting ASTM Standard 2729 or equivalent.

c. Height of outlets. The distribution box shall have outlets at the same level at least 4 inches above the bottom of the box to provide a minimum of 4 inches of water retention in the box.

d. Baffles. There shall be a pipe tee or baffle at the inlet to break the water flow.

e. Unused outlets. All unused outlet holes in the box shall be securely closed.

f. Materials. All distribution boxes shall be constructed of corrosion-resistant rigid plastic materials.

g. Level outlets. All outlets of the distribution box shall be made level. A 4-inch cap with an offset hole approximately 2½ inches in diameter shall be installed on each outlet pipe. These caps shall be rotated until all outlets discharge at the same elevation. Equivalent leveling devices may be approved by the local authority.

h. Equal length required. The soil absorption area serviced by each outlet of the distribution box shall be equal.

69.9(9) Dosing systems.

a. Pump systems.

(1) Pump and pit requirements. In the event the effluent from the septic tank outlet cannot be discharged by gravity and the proper lateral depths still maintained, the effluent shall discharge into a watertight pump pit with an inside diameter of not less than 24 inches, equipped with a tight-fitting manhole cover at grade level. The pump shall be of a submersible type of corrosion-resistant material.

(2) Pump setting. The pump shall be installed in the pump pit in a manner that

ensures ease of service and protection from frost and settled sludge. The pump shall be set to provide a dosing frequency of approximately four times a day based on the maximum design flow. No onsite electrical connections shall be located in the pump pit. These connections shall be located in an exterior weatherproof box.

(3) Pressure line size. The pressure line from the pump to the point of discharge shall not be smaller than the outlet of the pump it serves.

(4) Drainage. Pressure lines shall be installed to provide total drainage between dosing to prevent freezing or shall be buried below frost level up to the distribution box.

(5) High water alarm. Pump pits shall be equipped with a sensor set to detect if the water level rises above the design high water level when the pump fails. This sensor shall activate an auditory or visual alarm to alert the homeowner that repairs are required.

(6) Discharge point. The effluent shall discharge under pressure into a distribution box or may be distributed by small-diameter pipes throughout the entire absorption field.

b. Dosing siphons. Dosing siphons may also be used. The manufacturer's specifications shall be adhered to for installation. Similar dosing volumes and frequencies are recommended. Dosing siphons require periodic cleaning to ensure their continued proper operation.

c. Filtered pump vaults. A filtered pump vault is a device that is installed in a septic tank and houses a pump and screens effluent until it is pumped. Filtered pump vaults may be used when dosing volume is less than 50 gallons. Filtered pump vaults require periodic inspection and cleaning to ensure their continued proper operation.

567—69.10(455B) Mound systems.

69.10(1) General requirements.

a. Mound systems shall be permitted only after a thorough site evaluation has been made and landscaping, dwelling placement, effect on surface drainage, and general topography have been considered.

b. Mound systems shall not be utilized on sites subject to flooding with a ten-year or greater frequency.

c. Mound systems shall not be utilized on soils where the high groundwater level, impermeable bedrock or soil strata having a percolation rate exceeding 120 minutes per inch occur within 12 inches of natural grade or where creviced bedrock occurs within 20 inches of natural grade.

d. Mound systems shall be constructed only upon undisturbed naturally occurring soils or where a soil analysis has determined the site is suitable.

e. Mound systems shall be located in accordance with the distances specified in Table I as measured from the outer edge of the sand in the mound.

f. No buildings, driveways or other surface or subsurface obstructions shall be permitted within 50 feet on the down-gradient side of the mound when the mound is constructed on a slope greater than 5 percent. No future construction shall be permitted in this effluent disposal area as long as the mound is in use.

g. Specifications given in these rules for mounds are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of these rules may be necessary to properly design a mound system.

69.10(2) Material for mound fill.

a. The mound shall be constructed using clean, medium-textured sand, sometimes

referred to as concrete sand. The sand size shall be such that at least 25 percent by weight shall have a diameter between 2.0 and 0.25 mm; less than 35 percent by weight, a diameter between 0.25 and 0.05 mm; and less than 5 percent by weight, a diameter between 0.05 and 0.002 mm.

b. Rock fragments larger than 1/16 inch (2.0 mm) shall not exceed 15 percent by weight of the material used for mound fill.

69.10(3) Construction details.

a. There shall be a minimum of 3 feet of fill material and undisturbed naturally occurring soils between the bottom of the washed gravel and the highest elevation of the limiting conditions defined in paragraph 69.10(1)"c."

b. Gravel shall meet the requirements specified in paragraph 69.9(4)"a."

c. From 1 to 2 feet of medium-textured sand (depending upon the underlying soil depth, see paragraph 69.10(3)"a") must be placed between the bottom of the gravel and the top of the plowed surface of the naturally occurring soil.

d. Mound systems shall utilize an absorption bed distribution piping design. The bed shall be installed with the long dimension parallel to the land contour. Systems on steep slopes with slowly permeable soils should be narrow to reduce the possibility of toe seepage.

e. Minimum spacing between distribution pipes shall be 4 feet, and a minimum of 3 feet shall be maintained between any trench and the sidewall of the mound.

f. No soil under or up to 50 feet down gradient of the mound may be removed or disturbed except as specified herein.

g. Construction equipment which would cause undesirable compaction of the soil shall be kept off the base area. Construction or plowing shall not be initiated when the soil moisture content is high. If a sample of soil from approximately 9 inches below the surface can be easily rolled into a ⅛- to ¼-inch-diameter wire 1½ inches long or more, the soil moisture content is too high for construction purposes.

h. Aboveground vegetation shall be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material.

i. The area shall be plowed to a depth of 7 to 8 inches, parallel to the land contour, with the plow throwing the soil up slope to provide a proper interface between the fill and the natural soil. Tree stumps should be cut flush with the surface of the ground, and roots should not be pulled.

j. The base absorption area of the mound is to be calculated based on the results of the percolation rate test or soil analysis as indicated in Table IIIa or IIIb and the flow rate. The maximum width of the mound shall be 12 feet.

k. The area of the fill material shall be sufficient to extend 3 feet beyond the edge of the gravel area before the sides are shaped to at least a 4:1 slope (preferably 5:1).

l. Distribution system.

(1) The distribution pipe shall be rigid plastic pipe, Schedule 40 or 80, with a 1-inch nominal diameter or equivalent design that ensures proper distribution.

(2) The distribution pipe shall be provided with a single row of ¼-inch perforations in a straight line 30 inches on center along the length of the pipe or an equivalent design that ensures uniform distribution. All joints and connections shall be solvent-cemented.

(3) The distribution pipe shall be placed in the clean, washed gravel (or crushed

limestone as described in paragraph 69.9(4)“a”), with holes downward. The gravel shall be a minimum of 9 inches in depth below the pipe and 3 inches in depth above the pipe.

(4) No perforations shall be permitted within 3 inches of the outer ends of any distribution pipe.

(5) The outer ends of all pressure distribution lines shall be turned up, with a long 90-degree elbow or two 45-degree elbows to allow for cleaning. The outer ends will have a screw-on cap and cover. The cover shall be accessible from the ground surface without excavation.

(6) The central pressure manifold should consist of 1½- or 2-inch solid plastic pipe using a tee for connecting the distribution lines or an equivalent design that ensures uniform distribution.

m. Construction should be initiated immediately after preparation of the soil interface by placing all of the sand fill material needed for the mound (to the top of the trench) to a minimum depth of 21 inches above the plowed surface. This depth will permit excavation of the trenches to accommodate the 9 inches of washed gravel or crushed stone necessary for the distribution piping.

n. The absorption trench or trenches shall be hand-excavated to a depth of 9 inches. The bottoms of the trenches shall be level.

o. Nine inches of gravel shall be placed in the trench and leveled. After the distribution pipe is placed, the pipe shall be covered with 3 inches of gravel.

p. The top of the gravel shall be covered with synthetic drainage fabric. Unbacked, rolled 3½-inch-thick fiberglass insulation, untreated building paper, or other suitable material may be used with approval of the administrative authority. Plastic or treated building paper shall not be used.

q. After installation of the distribution system, the distribution system shall be pressure-tested before it is covered with gravel. The entire mound is to be covered with topsoil native to the site or of similar characteristics to support vegetation found in the area. The entire mound shall be crowned by providing 12 inches of topsoil on the side slopes, with a minimum of 18 inches of topsoil over the center of the mound. The entire mound shall be seeded, sodded or otherwise provided with a grass cover to ensure stability of the installation.

r. The area surrounding the mound shall be graded to provide for diversion of surface runoff water.

69.10(4) Dosing.

a. Pump dosing shall be required for mound systems.

b. The dosing volume shall be three to ten times the distribution piping network volume, but not more than 25 percent of the design flow shall be applied to the soil in one dose.

c. The dosing pump shall be capable of maintaining a squirt height of 3 feet above the pipe at the outer ends of the distribution lines. All lines shall have an equal squirt height above the pipe to maintain equal distribution.

567—69.11(455B) At-grade systems.

69.11(1) General requirements.

a. At-grade systems shall be permitted only after a thorough site evaluation has been made and landscaping, dwelling placement, effect on surface drainage, and general topography have been considered.

b. At-grade systems shall not be utilized on sites subject to flooding with a ten-year or greater frequency.

c. At-grade systems shall not be utilized on soils where the high groundwater level, impermeable bedrock or soil strata having a percolation rate exceeding 60 minutes per inch occur within 36 inches of natural grade.

d. At-grade systems shall be constructed only upon undisturbed naturally occurring soils or where a soil analysis has determined the site is suitable.

e. At-grade systems shall be located in accordance with the distances specified in Table I as measured from the outer edge of the gravel in the system.

f. No buildings, driveways or other surface or subsurface obstructions shall be permitted within 25 feet on the down-gradient side of the at-grade system when the at-grade system is constructed on a slope greater than 5 percent. No future construction shall be permitted in this effluent disposal area as long as the at-grade system is in use.

g. Specifications given in these rules for at-grade systems are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of these rules may be necessary to properly design an at-grade system.

69.11(2) Construction details.

a. There shall be a minimum of 3 feet of undisturbed naturally occurring soils between the bottom of the gravel in the at-grade system and the highest elevation of the limiting conditions defined in paragraph 69.11(1)"c."

b. An at-grade system may be installed up to 12 inches deep.

c. Gravel shall meet the requirements specified in paragraph 69.9(4)"a." Chambers or EPS aggregate are acceptable alternatives to gravel.

d. At-grade systems shall utilize an absorption bed distribution piping design. The bed shall be installed with the long dimension parallel to the land contour. Systems on steep slopes with slowly permeable soils should be narrow to reduce the possibility of toe seepage.

e. No soils under or within 15 feet of any at-grade system may be disturbed. On sloping sites, no soils shall be disturbed within 10 feet uphill of the system and within 15 feet downhill of the system plus an additional 5 feet for every 5 percent slope downhill.

f. Construction equipment which would cause undesirable compaction of the soil shall be kept off the base area. Construction or plowing shall not be initiated when the soil moisture content is high. If a sample of soil from approximately 9 inches below the surface can be easily rolled into a ⅛-inch diameter wire 1½ inches long, the soil moisture content is too high for construction purposes.

g. Aboveground vegetation shall be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material.

h. The area shall be plowed to a minimum depth of 7 to 9 inches, parallel to the land contour, with the plow throwing the soil up slope to provide a proper interface between the fill and the natural soil. Chisel teeth on a backhoe bucket shall be at least as long as the depth of plowing. Tree stumps should be cut flush with the surface of the ground, and roots should not be pulled. All work shall be done from the uphill side of the at-grade system.

i. The gravel bed absorption area of the at-grade system is to be calculated based on the results of the percolation rate test or soil analysis as indicated in Table IIIa or IIIb

and the flow rate. The maximum width of the at-grade system shall be 8 feet.

j. One foot of loamy cover material shall be installed over the rock bed. Cover shall extend at least 5 feet from the ends of the rock bed and be sloped to divert surface water. Side slopes shall not be steeper than 4:1. The upper 6 inches of the loamy soil cover must be topsoil borrow. Topsoil borrow must be of a quality that provides a good vegetative cover on the at-grade system.

k. Distribution system.

(1) The distribution pipe shall be rigid plastic pipe, Schedule 40 or 80 with a 1-inch nominal diameter or equivalent design that ensures proper distribution.

(2) The distribution pipe shall be provided with a single row of ¼-inch perforations in a straight line 30 inches on center along the length of the pipe or an equivalent design that ensures uniform distribution. All joints and connections shall be solvent-cemented.

(3) The distribution pipe shall be placed in the clean, washed gravel (or crushed limestone as described in paragraph 69.9(4)“a”), with holes downward. The gravel shall be a minimum of 10 inches in depth below the pipe and 2 inches in depth above the pipe.

(4) Distribution pipe shall be installed in the center of the gravel bed on slopes less than 1 percent and on the upslope edge at the gravel bed absorption width on slopes 1 percent or greater.

(5) No perforations shall be permitted within 3 inches of the outer ends of any distribution pipe.

(6) The outer ends of all pressure distribution lines shall be turned up, with a long 90-degree elbow or two 45-degree elbows to allow for cleaning. The outer ends will have a screw-on cap and cover. The cover shall be accessible from the ground surface without excavation.

(7) The central pressure manifold should consist of 1½- or 2-inch solid plastic pipe using a tee for connecting the distribution lines or an equivalent design that ensures uniform distribution.

(8) The top of the gravel shall be covered with synthetic drainage fabric. Unbacked, rolled 3½-inch-thick fiberglass insulation, untreated building paper, or other suitable material may be used with approval of the administrative authority. Plastic or treated building paper shall not be used.

(9) After installation of the distribution system, the distribution system shall be pressure-tested before it is covered with gravel. The entire at-grade system is to be covered with topsoil native to the site or of similar characteristics to support vegetation found in the area. The entire at-grade system shall be crowned by providing 12 inches of topsoil on the side slopes, with a minimum of 18 inches of topsoil over the center of the at-grade system. The entire at-grade system shall be seeded, sodded or otherwise provided with a grass cover to ensure stability of the installation.

(10) The area surrounding the at-grade system shall be graded to provide for diversion of surface runoff water.

69.11(3) Dosing.

a. Pump dosing shall be required for at-grade systems.

b. The dosing volume shall be three to ten times the distribution piping network volume, but not more than 25 percent of the design flow shall be applied to the soil in one dose.

c. The dosing pump shall be capable of maintaining a squirt height of 3 feet above the pipe at the outer ends of the distribution lines. All lines shall have an equal squirt height above the pipe to maintain equal distribution.

567—69.12(455B) Drip irrigation.

69.12(1) General design.

a. Pretreatment required. Drip irrigation systems must be preceded by a secondary treatment system discharging a treated, filtered effluent with BOD and TSS values less than 30 mg/L.

b. Separation from groundwater. Drip irrigation systems shall have a minimum vertical separation distance to high groundwater level or bedrock of 20 inches.

c. Maximum hillside slope. Drip irrigation systems shall not be installed on slopes of more than 25 percent.

d. Additional specifications. Specifications given in these rules for drip irrigation are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of these rules may be necessary to properly design a drip irrigation system.

69.12(2) Emitter layout.

a. Discharge rate. Systems shall be designed so that emitters discharge approximately 1 gpm at 12 psi or other rates suggested by the manufacturer and approved by the administrative authority.

b. Grid size. Drip lines shall be run in parallel lines 2 feet apart. Emitters shall be placed in the drip lines at 2-foot intervals, with emitters offset 1 foot between adjacent lines. Each emitter shall cover 4 square feet of absorption area.

c. Field size. The field shall be sized according to the application rate given in Table IV.

d. Depth of drip lines. Drip lines shall be laid on the contour, 6 to 12 inches deep, with a maximum line length of 100 feet. Lines may be of unequal length.

e. Interconnection.

(1) Drip lines shall all be connected to supply and return headers such that the entire system will automatically drain back to the dosing tank or pump pit upon completion of the pumping cycle. Vacuum breakers shall be positioned at the high point of the supply and return headers.

(2) The dosing tank shall have a high water audio/visual alarm.

Table IV
Length of Drip Line Required per Bedroom

Perc. Rate min./in.	Design Hyd. Loading gpd/sq.ft.	Length of Drip Line feet/bedroom
1 – 5	2.0	40
6 – 15	1.3	60
16 – 30	0.9	90
31 – 45	0.6	150
46 – 60	0.4	200
61 – 90	0.2	400
91 – 120	0.1	800

567—69.13(455B) Packed bed media filters.

69.13(1) Intermittent sand filters. The general requirements for intermittent sand filters are as follows:

a. Use. Intermittent sand filters may be used when the administrative authority determines the site is unacceptable for a soil absorption system.

b. Location. Intermittent sand filters shall be located in accordance with the distances specified in Table I.

c. Sampling port. A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line.

d. Effluent sampling. All intermittent sand filters having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

e. Prohibited construction. There shall be no construction, such as buildings or concrete driveways, covering any part of an intermittent sand filter.

69.13(2) Construction.

a. Number. An intermittent sand filter shall consist of one filtering bed or two or more filtering beds connected in series and separated by a minimum of 6 feet of undisturbed earth.

b. Pipelines. Each bed shall contain a horizontal set of collector lines. The collector lines shall be equivalent to SDR 35 PVC pipe, 10-inch-diameter gravelless drainpipe, EPS aggregate or other suitable materials.

(1) One collector line shall be provided for each 6 feet of width or fraction thereof. A minimum of two collector lines shall be provided.

(2) The collector lines shall be laid to a grade of 1 inch in 10 feet (or 0.5 to 1.0 percent).

(3) Each collector line shall be vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened or provided with a perforated cap.

(4) Gravelless drainfield pipe with fiber wrap may be used for the collector lines. If fiber wrap is used, no gravel or pea gravel is required to cover the collector lines and the pipe shall be bedded in filter sand.

(5) If 4-inch plastic pipe with perforations is used for the collector lines, the lines shall be covered as follows:

1. Gravel ¾ inch to 2½ inches in size shall be placed around and over the lower collector lines until there is a minimum of 4 inches of gravel over the pipes.

2. The gravel shall be overlaid with a minimum of 3 inches of washed pea gravel ⅛-inch to ⅜-inch size interfacing with the filter media. A layer of fabric filter may be used in place of the pea gravel. Fabric filters must be 30 by 50 mesh with a percolation rate of at least 5 gal/sq.ft.

(6) A minimum of 24 inches of coarse washed sand shall be placed over the pea gravel or above the gravelless drainfield pipe. The sand shall meet the Iowa DOT standards for concrete sand: 100 percent of the sand shall pass a 9.5 mm screen, 90 to 100 percent shall pass a 4.75 mm screen, 70 to 100 percent shall pass a 2.36 mm screen, 10 to 60 percent shall pass a 600 Tm screen, and 0 to 1.5 percent shall pass a 75 Tm screen.

(7) The discharge pipe that extends from the collection system shall be SDR 35 PVC pipe at a minimum.

69.13(3) Subsurface sand filters.

a. Distribution system and cover.

(1) Gravel base. Six inches of gravel ¾ inch to 2½ inches in size shall be placed upon the sand in the bed.

(2) Distribution lines. Distribution lines shall be level and shall be horizontally spaced a maximum of 3 feet apart, center to center. Distribution lines shall be rigid perforated PVC pipe.

(3) Venting. Venting shall be placed on the downstream end of the distribution lines, with each distribution line being vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened or provided with a perforated cap.

(4) Gravel cover. Enough gravel shall be carefully placed to cover the distributors.

(5) Separation layer. A layer of material such as unbacked, rolled 3½-inch-thick fiberglass insulation, untreated building paper of 40- to 60-pound weight or synthetic drainage fabric shall be placed upon the top of the upper layer of gravel.

(6) Soil cover. A minimum of 12 inches of soil backfill shall be provided over the beds.

(7) Distribution boxes. A distribution box shall be provided for each filter bed where gravity distribution is used. The distribution boxes shall be placed upon undisturbed earth outside the filter bed. Separate watertight lines shall be provided leading from the distribution boxes to each of the distributor lines in the beds.

(8) As an alternative to gravel and rigid PVC pipe, EPS aggregate may be used for the distribution system. The EPS aggregate shall cover the entire surface of the sand filter, and a 3-foot separation between distribution pipes shall be maintained.

(9) Pressure distribution. Pressure dosing is recommended to improve effluent distribution across the surface of the filter. Pressure distribution systems may use conventional rock and PVC pipe, chambers with small-diameter pipe, or EPS aggregate with small-diameter pipe.

b. Sizing of subsurface sand filters.

(1) Gravity flow. For residential systems, subsurface sand filters shall be sized at a rate of 240 square feet of surface area per bedroom.

(2) Siphon-dosed. For residential systems, subsurface sand filters dosed by a dosing siphon shall be sized at a rate of 180 square feet of surface area per bedroom.

(3) Pressure-dosed. For residential systems, subsurface sand filters dosed by a pump shall be sized at a rate of 150 square feet of surface area per bedroom.

(4) Nonhousehold. Effluent application rates for commercial systems treating domestic waste shall not exceed the following:

1. 1.0 gallon/square feet/day for single bed sand filters.

2. Total surface area for any subsurface sand filter system shall not be less than 200 square feet.

69.13(4) Free access sand filters.

a. Pretreatment required. These systems must be preceded by a secondary treatment system discharging a treated effluent with BOD and TSS values less than 30 mg/L.

b. Description. Media characteristics and underdrain systems for free access filters are similar to those for subsurface filters. Dosing of the filter should provide uniform

distribution across the entire surface of the bed. Dosing frequency is usually greater than four times per day. For coarser media (greater than 0.5 mm), a dosing frequency greater than six times per day is desirable. Higher acceptable loadings on these filters as compared to subsurface filters relate primarily to the accessibility of the filter surface for maintenance. Gravel is not used on top of the sand media, and the distribution pipes are exposed above the surface.

c. Distribution. Distribution to the filter may be by perforated pipe laid on the surface, by pipelines discharging to splash plates located at the center or corners of the filter, or by spray distributors. Care must be taken to ensure that lines discharging directly to the filter surface do not erode the sand surface. The use of curbs around the splash plates or large stones placed around the periphery of the plates will reduce the scour. A layer of washed pea gravel placed over the filter media may also be employed to avoid surface erosion. This practice will create maintenance difficulties, however, when it is time to rake or remove a portion of the media surface.

d. Covers. Free access filters shall be covered to protect against severe weather conditions and to avoid encroachment of weeds or animals. The cover also serves to reduce odors. Covers may be constructed of treated wooden planks, galvanized metal, or other suitable material. Screens or hardware cloth mounted on wooden frames may also serve to protect filter surfaces. Where weather conditions dictate, covers should be insulated. A space of 12 to 24 inches should be allowed between the insulated cover and sand surface. Free access filters may not be buried by soil or sod.

e. Loading. The hydraulic loading for free access sand filters shall be 5.0 gpd/sq.ft.

69.13(5) Dosing. Dosing for sand filters is strongly advised. Without dosing, the entire area of the sand filter is never effectively used. Dosing not only improves treatment effectiveness but also decreases the chance of premature failure.

a. Pumps. A pump shall be installed when adequate elevation is not available for the system to operate by gravity.

(1) The pump shall be of corrosion-resistant material.

(2) The pump shall be installed in a watertight pit.

(3) The dosing system shall be designed to flood the entire filter during the dosing cycle. A dosing frequency of greater than two times per day is recommended.

(4) A high water alarm shall be installed.

b. Dosing siphons. When a dosing siphon is used where elevations permit, such siphon shall be installed as follows:

(1) Dosing siphons shall be installed between the septic tank and the sand filter bed.

(2) Dosing siphons shall be installed with strict adherence to the manufacturer's instructions.

c. Dosing tanks. The dosing tank shall be of such size that the siphon will distribute effluent over the entire filter during the dosing cycle. Smaller, more frequent doses are recommended.

d. Effluent sampling. A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. All free access sand filters having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

69.13(6) Peat moss biofilter systems. General requirements for individual peat moss biofilter systems are as follows:

a. Use. Peat moss biofilter systems may be used when the administrative authority determines the site is unacceptable for a soil absorption system.

b. Certification. All peat moss biofilter systems shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 40, Class I, including appendices (March 2008), or equivalent testing as determined by the department.

c. Installation and operation. All peat moss biofilter systems shall be preceded by a septic tank and installed, operated and maintained in accordance with the manufacturer's instructions and the requirements of the administrative authority. The septic tank shall be sized as specified in paragraph 69.8(2)"a" or larger if recommended by the manufacturer. Sizing of the system should be based on the manufacturer's specifications.

d. Maintenance contract. A maintenance contract for the proper monitoring and servicing of the entire treatment system shall be established between the owner and a certified technician for the life of the system. All monitoring and servicing shall be performed by a manufacturer's certified technician or person demonstrating knowledge of the system in accordance with the manufacturer's standards. Manufacturers are responsible for ensuring that an adequate number of maintenance providers are available to service all peat moss biofilters at the specified intervals. Maintenance contracts and responsibility waivers shall be recorded with the county recorder and in the abstract of title for the premises on which the system is installed. The maintenance provider shall perform the required maintenance and reporting to the owner and to the administrative authority. The maintenance provider shall also report any discontinuance of maintenance of the peat moss biofilter system to the administrative authority. Peat moss biofilter systems shall be inspected annually by the maintenance provider. A copy of the maintenance contract shall be on file in the office of the administrative authority.

e. Effluent sampling. A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. All peat moss biofilter systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

69.13(7) Recirculating textile filter systems. General requirements for recirculating textile filter systems are as follows:

a. Use. Recirculating textile filter systems may be used when the administrative authority determines the site is unacceptable for a soil absorption system.

b. Certification. All recirculating textile filter systems shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 40, Class I, including appendices (March 2008), or equivalent testing as determined by the department.

c. Design. Recirculating textile filter systems shall be designed to prevent the passage of untreated waste during an equipment malfunction or power outage.

d. Installation and operation. Recirculating textile filter systems shall be preceded by a septic tank and installed, operated and maintained in accordance with the manufacturer's instructions and the requirements of the administrative authority. The septic tank shall be sized as specified in paragraph 69.8(2)"a" or larger if recommended

by the manufacturer. Sizing of the system should be based on the manufacturer's specifications.

e. Maintenance contract. A maintenance contract for the proper monitoring and servicing of the entire treatment system shall be established between the owner and a certified technician for the life of the system. All monitoring and servicing shall be performed by a manufacturer's certified technician or person demonstrating knowledge of the system in accordance with the manufacturer's standards. Manufacturers are responsible for ensuring that an adequate number of maintenance providers are available to service all recirculating textile filters at the specified intervals. Maintenance contracts and responsibility waivers shall be recorded with the county recorder and in the abstract of title for the premises on which the system is installed. The maintenance provider shall perform the required maintenance and reporting to the owner and to the administrative authority. The maintenance provider shall also report any discontinuance of maintenance of the system to the administrative authority. Recirculating textile filter systems shall be inspected, at minimum, annually by the maintenance provider. A copy of the maintenance contract shall be on file in the office of the administrative authority.

f. Effluent sampling. A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. All recirculating textile filter systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

567—69.14(455B) Aerobic treatment units. General requirements for aerobic treatment units are as follows:

69.14(1) Use. Aerobic treatment units may be used only when the administrative authority determines that the site is unacceptable for a soil absorption system. Because of the higher maintenance requirements of aerobic treatment units, preference should be given to packed bed media filters, where conditions allow.

69.14(2) Certification. All aerobic treatment units shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 40, Class I, including appendices (March 2008), or equivalent testing as determined by the department.

69.14(3) Installation and operation. All aerobic treatment units shall be installed, operated and maintained in accordance with the manufacturer's instructions and the requirements of the administrative authority. The aerobic treatment units shall have a minimum treatment capacity of 150 gallons per bedroom per day or 500 gallons, whichever is greater.

69.14(4) Pre-tank required. All aerobic treatment units shall be preceded by a septic or trash tank with a minimum capacity of 500 gallons. The trash tank may be a single-compartment tank. A trash tank built in as part of the aerobic treatment unit's design satisfies this requirement.

69.14(5) Effluent treatment. The effluent from aerobic treatment units shall receive additional treatment through the use of intermittent sand filters or soil absorption systems of a magnitude prescribed in subrule 69.9(2) for pretreated effluent.

69.14(6) Maintenance contract. A maintenance contract with a manufacturer-certified technician or equivalent, as determined by the department, shall be maintained at all times. The maintenance contract shall include the aerobic treatment unit and effluent disposal system. Manufacturers are responsible for ensuring that an adequate number of

maintenance providers are available to service all aerobic treatment units at the specified intervals. Maintenance agreements and responsibility waivers shall be recorded with the county recorder and in the abstract of title for the premises on which aerobic treatment units are installed. Aerobic treatment units shall be inspected for proper operation at least twice a year on six-month intervals.

69.14(7) Effluent sampling. All aerobic treatment unit systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

567—69.15(455B) Constructed wetlands.

69.15(1) General site design.

a. Application. Constructed wetlands shall only be used where soil percolation rates at the site exceed 120 minutes per inch. Because of the higher maintenance requirements of constructed wetland systems, preference should be given to packed bed media filters, where conditions allow.

b. Effluent treatment. The effluent from a constructed wetland shall receive additional treatment through the use of intermittent sand filters of a magnitude prescribed in subrule 69.9(2) for pretreated effluent.

c. Effluent sampling. All constructed wetland systems having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

d. Additional specifications. Specifications given in this rule for constructed wetlands are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of this rule may be necessary to properly design a constructed wetland system.

69.15(2) Wetland design.

a. Depth. The wetland shall be of a subsurface flow construction with a rock depth of 18 inches and a liquid depth of 12 inches.

b. Materials. Substrate shall be washed river gravel with a diameter of ¾ inch to 2½ inches. If crushed quarried stone is used, it must meet the criteria listed in paragraph 69.9(4)“a.”

c. Sizing and configuration. Detention time shall be a minimum of seven days.

(1) Dimensions. This may be accomplished with trenches 16 to 18 inches deep (12 inches of liquid), 3 feet wide, with 100 feet of length per bedroom. This may also be done with beds 16 to 18 inches deep, with at least 300 square feet of surface area per bedroom. The bottom of each trench or bed must be level within ±½ inch.

(2) Configuration. Multiple trenches or beds in series should be used. Beds or trenches in series may be stepped down in elevation to fit a hillside application. If the system is on one elevation, it should still be divided into units by earthen berms at about 50 and 75 percent of the total length.

(3) Unit connections. Each subunit shall be connected to the next with an overflow pipe (rigid sewer pipe) that maintains the water level in the first section. Protection from freezing may be necessary.

d. Liner. Wetlands shall be lined with a synthetic PVC or PE plastic liner 20 to 30 mils thick.

e. Inlet pipe. Effluent shall enter the wetland by a 4-inch pipe sealed into the liner.

With beds, a header pipe shall be installed along the inlet side to distribute the waste.

f. Protective berms. Wetland system sites shall be bermed to prevent surface water from entering the trenches or beds.

69.15(3) Vegetation.

a. Setting plants. Vegetation shall be established on the wetlands at the time of construction. Twelve inches of rock shall be placed in each unit, the plants set, and then the final 4 to 6 inches of rock placed.

b. Plant species. Only indigenous plant species, preferably collected within a 100-mile radius of the site, shall be set. Multiple species in each system are recommended. Preferred species include, but are not limited to:

(1) Typha latifolia – common cattail.

(2) Typha angustifolia – narrow leaf cattail.

(3) Scirpus spp. – bullrush.

(4) Phragmites communis – reed.

c. Plant establishment. Transplantation is the recommended method of vegetation establishment. For transplanting, the propagule should be transplanted, at a minimum, on a 2-foot grid. The transplants should be fertilized, preferably with a controlled-release fertilizer such as Osmocote 18-5-11 for fall and winter planting, 18-6-12 for spring planting, and 19-6-12 for summer planting. Trenches or beds should be filled with fresh water immediately.

d. Plant management. In the late fall, the vegetation shall be mowed and the detritus left on the wetland surface as a temperature mulch. In the early spring, the mulch shall be removed and disposed of to allow for adequate bed aeration.

567—69.16(455B) Waste stabilization ponds.

69.16(1) General requirements. Waste stabilization ponds shall only be used for nonresidential applications and shall be designed by an Iowa-licensed engineer. Waste stabilization ponds may be used if designed and constructed in accordance with the following criteria and provided the effluent is discharged in accordance with the requirements of the NPDES general permit listed in rule 69.4(455B). A septic tank sized according to rule 69.8(455B) shall precede a waste stabilization pond.

69.16(2) Location. Waste stabilization ponds must meet the following separation distances:

a. 1,000 feet from the nearest inhabitable residence, commercial building, or other inhabitable structure. If the inhabitable or commercial building is the property of the owner of the proposed treatment facility or there is written agreement with the owner of the building, this separation criterion shall not apply. Any such written agreement shall be filed with the county recorder and recorded for abstract of title purposes, and a copy submitted to the department.

b. 1,000 feet from public shallow wells.

c. 400 feet from public deep wells.

d. 400 feet from private wells.

e. 400 feet from lakes and public impoundments.

f. 25 feet from property lines and rights-of-way.

69.16(3) Size.

a. Dimensions. Ponds shall have a length not exceeding three times the width.

b. Capacity. When domestic sewage from a septic tank is to be discharged to a

waste stabilization pond, the capacity of the pond shall be equivalent to 180 times the average daily design flow.

c. Depth. The wastewater depth for a waste stabilization pond shall be 3 feet to 5 feet and shall be uniform.

d. Freeboard. A minimum freeboard of 2 feet shall be maintained at all times.

69.16(4) Embankments.

a. Seal. Embankments shall be constructed of impermeable materials and shall be compacted. The bottom of the waste stabilization pond shall be cleared and leveled to the required elevation and shall be lined with an impermeable natural or man-made material. Seepage loss through the sides and bottom shall be less than 1/16 inch per day.

b. Slopes. The ratio of inside embankment slopes shall be 3 horizontal to 1 vertical. The outside embankments slope ratio shall be at least 3:1.

c. Berm top. Berm tops shall be at least 4 feet wide.

d. Cover. Embankments shall be seeded from the outside toe to the inside high water line. From the high water line down the embankment diagonally, about 5 feet shall be riprapped for erosion and vegetation control.

69.16(5) Inlet and outlet structures.

a. Inlet. The inlet shall be placed no higher than 12 inches above the bottom of the pond. It shall discharge near the middle of the pond at a point opposite the overflow structure and onto a concrete splash plate at least 2 feet square.

b. Outlet. The outlet pipe shall withdraw water from a submerged depth of at least 1 foot. The intake for the outlet pipe shall be 3 to 5 feet from the embankment.

c. Separation. The inlet and outlet should be separated to the maximum extent possible, ideally by a berm or baffle constructed in the lagoon to prevent short-circuiting.

69.16(6) Drainage. All surface water shall be diverted away from the waste stabilization pond.

69.16(7) Effluent sampling. All waste stabilization ponds having an open discharge shall be sampled in accordance with the requirements of NPDES General Permit No. 4 if applicable.

69.16(8) Maintenance.

a. Fencing. All waste stabilization ponds are to be fenced adequately to prevent entrance of livestock and to discourage entrance by people into the area. Signs shall be posted warning of possible health and safety hazards.

b. Vegetation. Vegetation on the top and sides of the berm shall be mowed and the length maintained. No trees shall be allowed to become established.

567—69.17(455B) Requirements for impervious vault toilets. All impervious vault toilets shall comply with the following requirements:

69.17(1) Location. Impervious vault toilets shall be located in accordance with the distances given in Table I in rule 69.3(455B) for the closed portion of the treatment system.

69.17(2) Construction. The vault shall be constructed of reinforced, impervious concrete at least 4 inches thick. The superstructure including floor slab, seat, seat cover, riser and building shall comply with good design and construction practices to provide permanent, safe, sanitary facilities. The vault shall be provided with a cleanout opening fitted with a fly-tight cover.

69.17(3) Wastewater disposal. Wastewater from impervious vault toilets shall be

disposed of at a public sewage treatment facility.

567—69.18(455B) Requirements for portable toilets. All portable toilets shall be designed to receive and retain the wastes deposited in them and shall be located and maintained in a manner that will prevent the creation of any nuisance condition. Wastewater from portable toilets shall be disposed of at a public sewage treatment facility.

567—69.19(455B) Other methods of wastewater disposal. Other methods or types of private wastewater treatment and disposal systems shall be installed only after plans and specifications for each project have been approved by the administrative authority.

567—69.20(455B) Disposal of septage from private sewage disposal systems.

69.20(1) The collection, storage, transportation and disposal of all septage shall be carried out in accordance with the requirements in 567—Chapter 68.

69.20(2) Commercial septic tank cleaners. Individual administrative authorities shall enforce the licensing program for commercial septic tank cleaners in accordance with the requirements of 567—Chapter 68.

567—69.21(455B) Experimental private sewage disposal systems.

69.21(1) Design requirements. Experimental systems are to be designed and operated in accordance with approved standards and operating procedures established by individual administrative authorities.

a. Plans and specifications, meeting all applicable rule requirements, should be prepared and submitted to the administrative authorities by a licensed professional engineer. Included with the engineering submittal should be adequate supporting data relating to the effectiveness of the proposed system.

b. For systems designed to discharge treated effluent into waters of the state, a Notice of Intent to be covered under the requirements of NPDES General Permit No. 4 shall be obtained. The administrative authority is responsible for determining that the requirements of the permit, including the monitoring program, are met.

c. Administrative authorities should prepare for signature an enforceable agreement to be placed on record which would require that present and future system owners meet all applicable rule requirements. In the event of noncompliance, the administrative authority shall require that adequate steps be taken by the system owner to bring the system into compliance or that the system owner replace the system with a system prescribed in these rules.

69.21(2) Reserved.

567—69.22(455B) Variances. Variances to these rules may be granted by the department of natural resources or the administrative authority provided sufficient information is submitted to substantiate the need for and propriety of such action. Applications for variances and justification shall be in writing and copies filed with the department.

These rules are intended to implement Iowa Code chapter 455B, division III, part 1.

Appendix A
Estimates of Nonhousehold Domestic Sewage Flow Rates

Source of use for sewage unit	(units)	Gallons per day per unit
Dwelling Units		
Hotels or luxury motels	(Each guest)	60
	(Add per employee)	13
or	(Per square foot)	0.3
Discount motels	(Each guest)	40
	(Add per employee)	13
or	(Per square foot)	0.46
Rooming house	(Each resident)	50
	(Add per nonresident meal)	4.0
Commercial/Industrial		
Retail stores	(Per square foot of sales area)	0.15
or	(Each customer)	5
	(Plus each employee)	15
or	(Each toilet room)	630
Offices	(Each employee)	18
or	(Per square foot)	0.25
Medical offices	(Per square foot)	1.6
Industrial buildings	(Each employee)	20
(Does not include process ware or cafeteria)		
Construction camp	(Each employee)	20
Visitor center	(Each visitor)	20
Laundromat	(Each machine)	690
or	(Each load)	50
or	(Per square foot)	2.9
Barber shops	(Per chair)	80

Source of use for sewage unit	(units)	Gallons per day per unit
Beauty shops	(Per station)	300
Car washes	(Per inside square foot)	10
(Does not include car wash water)		
Eating and Drinking Establishments		
Restaurant	(Per meal)	4.0
(Does not include bar or lounge)		
or	(Each seat)	40
	(Plus add for each employee)	13
Dining hall	(Per meal)	4.0
Coffee shop	(Each customer)	2.5
	(Add per employee)	13
Cafeteria	(Each customer)	2.5
	(Add per employee)	13
Drive-in	(Per car stall)	145
Bar or lounge	(Each customer)	5.5
	(Add per employee)	16
or	(Per seat)	40
Country clubs	(Per member) (no meals)	22
or	(Per member) (Meals and showers)	130
or	(Per member in residence)	100
Resorts		
Housekeeping cabin	(Per person)	50
Lodge	(Per person)	74
Parks/swimming pools	(Per guest)	13
Picnic parks with toilet only	(Per guest)	10

Source of use for sewage unit	(units)	Gallons per day per unit
Movie theaters	(Per guest)	4.0
Drive-in theaters	(Per space)	5
Skating rink/dance hall	(Per customer)	10
Bowling lanes	(Per lane)	200
Transportation		
Airport, bus or rail depot	(Per passenger)	4
or	(Per square foot)	6.5
or	(Per public restroom)	630
Auto service station	(Each vehicle served)	13
	(Add per employee)	16
or	(Per inside square foot)	0.6
or	(Per public restroom)	630
Institutional		
Hospitals	(Each medical bed)	250
	(Add per employee)	16
Mental institution	(Each bed)	175
	(Add per employee)	16
Prison or jail	(Each inmate)	160
	(Add per employee)	16
Nursing home	(Each resident)	145
	(Add per employee)	16
Schools and Churches		
School	(Per student) (No gym, cafeteria or showers)	17
	(Per student) (Cafeteria only)	17
	(Per student) (Cafeteria, gym & showers)	30

Source of use for sewage unit	(units)	Gallons per day per unit
Boarding school	(Per student)	115
Churches	(Per member)	2
	(Per member with kitchen)	5
Recreational		
Campground/with hookups	(Per person)	40
or	(Per site with central bath)	100
	(Per site)	75
	(Add for dump station w/ hookup)	16
Day camp (no meals)	(Per person)	16
Weekly overnight camp	(Per member)	33

Appendix B
Percolation Test Procedure

1. At least three test holes distributed evenly over the proposed lateral field are required.

2. Percolation test holes shall be 4 to 12 inches in diameter and to the same depth as the proposed absorption trenches (not to exceed 36 inches in depth).

3. Sides and bottoms of the test holes shall be scratched or roughened to provide a natural surface. All loose material shall be removed from each hole.

4. The bottoms of the test holes shall be covered with approximately 2 inches of rock to protect the bottom from scouring action when the water is added.

5. The hole shall be filled with at least 12 inches of clean water, and this depth shall be maintained for at least 4 hours and preferably overnight if clay soils are present. It is important that the soil be allowed to soak for a sufficiently long period of time to allow the soil to swell if accurate results are to be obtained. Failure to perform the presoak when required will invalidate the percolation test results.

6. In sandy soils with little or no clay, soaking is not necessary. If, after the hole has been filled twice with 12 inches of water, the water seeps completely away in less than 10 minutes, the test can proceed immediately.

7. Except for sandy soils, percolation rate measurements should be made at least 4 hours but no more than 24 hours after the soaking period began. Any soil that sloughed into the hole during the soaking period is removed, and the water level is adjusted to 6 inches above the gravel (or 8 inches above the bottom of the hole). At no time during the test is the water level allowed to rise more than 6 inches above the gravel.

8. Immediately after adjustment, the water level is measured from a fixed reference point to the nearest ⅛ inch at 30-minute intervals. The test is continued until two successive water level drops do not vary by more than ⅛ inch. At least three measurements are made.

9. After each measurement, the water level is readjusted to the 6-inch level. The last water level drop is used to calculate the percolation rate.

10. In sandy soils or soils in which the first 6 inches of water added after the soaking period seeps away in less than 30 minutes, water level measurements are made at 10-minute intervals for a 1-hour period. The last water level drop is used to calculate the percolation rate.

11. The percolation rate is calculated for each test hole by dividing the time interval used between measurements by the magnitude of the last water level drop. This calculation results in a percolation rate in terms of minutes per inch. To determine the percolation rate for the area, the rates obtained from each hole are averaged. (If tests in the area vary by more than 20 minutes per inch, variations in soil type are indicated. Under these circumstances, percolation rates should not be averaged.) EXAMPLE: If the last measured drop in water level after 30 minutes is ⅝ inch, the percolation rate = (30 minutes)/(⅝ inch) = 48 minutes/inch.

PUBLIC PARTICIPATION RESPONSIVENESS SUMMARY

FOR

CHAPTER 69, PRIVATE SEWAGE DISPOSAL SYSTEMS

- TECHNICAL UPDATES -

- TIME OF TRANSFER INSPECTIONS -

- NPDES GENERAL PERMIT #4 RENEWAL -

DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL SERVICES DIVISION

December 16, 2008

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RESPONSIVENESS SUMMARY

This is a summary of and response to the comments received in response to the proposed changes to IAC 567 Chapter 69. This document also contains recommendations for final EPC action on the technical changes, time of transfer inspections and General Permit #4 renewal. The proposed amendments were published as a Notice of Intended Action (NOIA) in the Iowa Administrative Bulletin on November 5, 2008 as **ARC 7308B**. The Administrative Rules Review Committee reviewed the rules at their December 10, 2008 meeting. No further action was requested.

In brief, the amendments as proposed in the Notice would add a time of transfer section as required by Senate File 261 and add new technologies and changes to reflect the latest research and experience with onsite systems in Iowa. Changes also include the renewal of NPDES General Permit #4 for discharging onsite systems.

The following is a summary of the proposed amendments to the rules:

- Title changed to "Private Sewage Disposal Systems" to match Iowa Code
- Changes and additions to definitions
- Addition of a time of transfer inspection section
- Addition of final inspection requirement and database tracking
- Changes to the requirements for discharging systems and NPDES permitting
- Changes to septic tank sizing and configuration
- Addition of soil loading rates to absorption system sizing
- Addition of requirements for grease traps, tank abandonment, pump vaults, at-grade soil systems, EPS aggregate, peat filters and textile filters.
- Removal of some applications of free access sand filters and waste stabilization ponds.
- Additional requirements for aerobic treatment units.
- General permit 4 will change to include only those discharging onsite systems that pose a substantial risk to water quality.

IAC 567-Chapter 64.15 will change to reflect the change in effective dates of the NPDES General Permit #4.

Three public hearings were held on December 2, 3, and 4, 2008, in Des Moines, Iowa City and Ft. Dodge respectively. Written comments were received through December 5, 2008.

Thirty persons or groups provided oral or written comments on the proposed amendments. The responsiveness summary addresses all of the comments received. The

comments received are addressed below in terms of the issue involved. The commentators' names are listed in the Appendix.

Issue: Comments in Support of the Proposed Amendments

Comments:
Numerous comments were received in support of the proposed amendments. These comments are paraphrased below.

- The Department should be commended for completing the long difficult process of amending Chapter 69.
- The addition of peat and textile filters is great and needed to keep up with changing technology.
- The addition of a more comprehensive soil characterization system is a great improvement.
- Time of Transfer will be a great help to the County.
- We would like to take this opportunity to commend DNR, as well as the legislature, for the time of transfer section. We are aware of several other states that have implemented "time of transfer" inspections of private sewage disposal systems and the programs work well and benefit public health and the environment.
- We commend the Department for including this statement in the rule, "Subsurface soil absorption systems are the best available treatment technology and shall always be used where possible."
- It is good to see that effluent screens are required, septic tanks are to be watertight and watertight risers are required.
- I'm very much in favor of the rules as they are written. The proposed changes, especially the time of transfer inspection program, are something we need.
- I think the section on the abandonment of private wastewater systems is good. I think that that's a nice addition. The time of transfer inspections, I think is also a good step.
- The changes to the NPDES General Permit section are good and will provide a more meaningful protection of designated waters of the state.
- I certainly support the Iowa Legislature for passing the time of transfer or real estate inspections, it's a big historical moment.
- I'm happy to see time of transfer inspections and certification for people doing the inspections.

Discussion:
The Department appreciates the positive comments and the considerable input and assistance provided by county personnel and others in the development of these rule amendments. The implementation and enforcement of these rule amendments will continue to be a joint effort between the Department and the counties.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Three-Foot Vertical Separation From the Bottom of a Soil Trench to the Water Table or Limiting Layer

Comments:
One comment was received asking that the vertical separation be reduced and several comments were received supporting the current vertical separation. The comments are paraphrased below.

- The three-foot limiting layer should be reduced to two feet or the distance should be set by the local authority. The three-foot separation is unduly strict and provides no additional treatment benefit and is a financial burden on homeowners.
- The DNR should be commended for keeping the more strict separation of three feet. Allowing a two foot separation would encourage even less separation. There are other options to more costly alternative systems.
- I support the 3 feet separation distance and I do not believe it would be beneficial to change it. The extra 1-foot should be considered for failures, unpredictable weather patterns, and changes in soil morphology.
- We need the extra foot to ensure we have adequate separation.
- If we want installers to maintain a 2 feet minimum to protect the groundwater, then the state should set the minimum at 3 feet. This way, we ensure the minimums are met.
- 3 foot vertical separation: I agree completely with keeping this due to the extreme soil structures and groundwater issues that we face, especially here in Southern Iowa.
- In regards to the three-foot separation distance, I appreciate that that has been left as it is. We support maintaining that separation distance, I think we're taking the necessary steps to protect the ground water of the state.

Discussion:
The U.S. EPA Onsite Design Manual recommends a 2-4 foot vertical separation from the bottom of a soil absorption trench to a limiting layer such as the water table, bedrock or an impermeable layer of soil. While a few states may use two feet, those states typically have a requirement for a soil profile performed by a certified soil scientist or analyst to determine the placement and sizing of a soil absorption system. Iowa has no such requirement and still predominantly uses percolation tests. Other states such as Nebraska have set the vertical separation at four feet.
The aerated or "vadose" zone below a soil trench is extremely important in regards to the treatment of the wastewater received by the trench. Without oxygen, bacteria that provide the bulk of the treatment form a thick, slimy coating around themselves that ultimately causes the system to fail. The wastewater treatment is done in this vadose zone, not in the trench. Treatment is hindered by the presence of water or anaerobic conditions in this area.

The presence of water also inhibits the hydraulic conductivity of the soil making it more difficult to move the treated water away from the system. Groundwater mounding can result causing a hydraulic strain on the system that may lead to surfacing of effluent.

National studies have shown that most wastewater bacteria are removed in the first foot of soil. However, numerous other studies show this process is hindered in saturated soils and the beneficial bacteria we rely on for treatment form a thick biomat (dead bacteria and slime coatings) more quickly, leading to premature failure of the system. Soil trench systems that show an accumulation of biomat are typically too close to the water table. A systems properly placed above the seasonal water table will show little or no accumulation of biomat over the life of the system.
For these reasons the vertical separation to a limiting layer should remain at the more conservative EPA recommendation of three feet.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: The Definition of Administrative Authority Should Not Include the Department

Comments:
Three comments were received about this issue. These comments were similar and are paraphrased below.

- Adding the Department in the definition of administrative authority creates another layer of bureaucracy, undermines the authority of the local board of health and causes confusion.

Discussion:
Iowa Code section 455B.172 grants concurrent authority to the Department to regulate private sewage disposal systems. This Code section also requires counties to enforce these regulations. Adding the Department to the definition clarifies the responsibilities of both agencies. Local boards of health will remain the lead agencies for enforcement of the private sewage disposal rules.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: The Tank Abandonment Section Should Not be Included in the Rules

Comments:
Two comments were received about tank abandonment. They are paraphrased below.

- I am concerned that when a property is abandoned no one will monitor or pay for tank abandonment. This will cause an undue hardship for the county.

- Many sites have an existing tank that is too small or poorly constructed to justify having a licensed septic tank cleaner pump it out.

Discussion:
Proper tank abandonment is important for the safety of residents that may live in areas where septic systems have been replaced. Septic tanks that are abandoned without pumping and filling with soil may cave in causing a hazard and potentially trapping someone. In addition, if the tank is not pumped, septage may leak from the tank into groundwater or onto the surface.
Typically septic tanks that are abandoned are not the result of abandoned homes. They result from the installation of a new septic system or the home being hooked up to a central sewer. These tanks can be properly abandoned easily when the new installation is done.
Any tank pumping must be done by a licensed septic tank cleaner by rule (IAC567 – Ch.68). This rule allows the septage to be tracked and managed properly

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Who Should be Permitted to Become a Certified Time of Transfer Inspector

Comments:
Three comments were received about time of transfer inspector qualifications. These comments are paraphrased below.

- I am concerned with possible conflict of interest with this being open to anyone who can get certified. There may be systems failed that are okay or passed when they should be failed in order to help the landowner or person doing the inspection.
- In my opinion, this is a function that ONLY the County Sanitarian should serve.
- A certified time of transfer inspector should not be authorized to make repairs on systems they inspect.

Discussion:
Senate File 261 required that the Department certify time of transfer inspectors and set up a training program to ensure uniform inspections. It states that county personnel may become certified inspectors but must allow anyone certified by the Department to conduct inspections within their county. The intent of the law was to allow anyone to become an inspector and that all inspectors attend the same training program to ensure uniform inspections.
The number of inspections that will be generated by this new law will be considerable. The Department did not wish to hinder the sale of homes with septic systems by limiting the number of people who could become certified.

While we share some concerns about conflicts of interest, we hope to deal with this, if necessary, through the certification process. This process includes a disciplinary procedure and a complaint procedure is being developed. This process, plus the possibility of litigation for fraudulent inspections, should alleviate any conflict of interest problems.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: The Time of Transfer Inspection Rules Contain Errors and Omissions

Comment:
Several comments were received regarding the language and requirements for the time of transfer inspector's section of the rules.

- The Department's Legal Bureau commented that the disciplinary section, taken from Chapter 82, contained errors. The disciplinary section contains a procedural error in referencing meetings with the EPC and also includes a Code reference that is outdated. This section should be replaced with the disciplinary section from Chapter 81.
- This section does not specify the effective date of time of transfer inspections.
- The continuing education credit dates must coincide with the dates for water and wastewater operators to utilize the OpCert database. In addition, a new inspector certified after April 1 cannot get CEU's before the next time period.
- State law requires the "noncompliance with child support procedures" section in rules dealing with certification or licensure.

Discussion:
The initial disciplinary section was taken from Chapter 82, "Water Well Contractor Certification". The Legal Bureau discovered that this section itself was outdated and needs replacement.
The effective date of the time of transfer legislation will be after the effective date of these rules. This date was omitted.
The Operator Certification staff noted that the database to be used for the certified time of transfer inspectors has the continuing education dates set between April 1 and March 30 of even-numbered years. Using other dates would require considerable re-programming of the database.
OpCert staff also pointed out that newly certified inspectors who receive their certification after April 1 should be allowed to get their CEU's the following certification period. Otherwise they only have 2 months to get 12 CEU's.
The OpCert staff also noted the requirement for non-compliance with child support language in certification rules.

Recommendation:

Replace the disciplinary section of the time of transfer inspector rules with the disciplinary section from Chapter 81 "Water and Wastewater Operator Certification."
Add the effective date of the time of transfer inspection requirement in the appropriate section.
Change the dates for continuing education accrual to match those of water and wastewater operators.
Add language to exempt newly certified inspectors from CEU's until the following certification period. The language can be taken from Chapter 81.
Add the noncompliance with child support language to the time of transfer rules.

Issue: The Time of Transfer Inspection Procedures

Comments:
Various comments were received concerning the time of transfer inspection procedures. These comments are paraphrased below.

- The time of transfer inspection worksheet should include the properties legal description.
- Why do the Department and the county Recorder get copies of the inspection report from the inspector and what happens if the county sanitarian disagrees with the inspection?
- The Recorder should know that the system is approved before he gets any paperwork.
- If a system is found to be functional, it should not required to upgraded.
- Permits should be issued for 5 years instead of two. This seems like another way to get extra fee money for the state.
- Counties should be allowed to have a more stringent definition of transfer.
- Counties should be allowed to be more restrictive than the state for time of transfer inspections.
- Environmental Health Specialists (sanitarians) should be exempt from the certification criteria.
- Packaged treatment units should have an effluent sample taken in addition to the inspection according to manufacturer's recommendations.

Discussion:
When the time of transfer inspection sheet was developed every attempt was made to keep it at a workable length. Several national and other state forms were used as models. These forms contain as many as 12 pages. For a new program it was felt the inspection form should be as short as possible and with most counties now tracking septic systems by E911 address the legal description was left out. The new Onsite Wastewater Database system also uses E911 addresses. The Iowa Recorders Association has reviewed the rules and did not object to the form.
The Department requires the form to monitor the inspection process and the inspectors. A copy of the form must go to the Recorder as part of the Groundwater Hazard Statement requirements. This Groundwater Hazard Statement has been modified to include the verification that a property has a septic system so a Recorder knows which homes require

time of transfer inspections. The law only requires that the Recorder not record the deed until an inspection has been done. If a repair or replacement is required, the county sanitarian is responsible to ensure that it is done.
If the county sanitarian believes that an inspector falsified an inspection or missed an important aspect of the inspection, they have the authority to visit the site to confirm their suspicions. If they can show the septic system is malfunctioning and creating a public health or environmental hazard, they can compel replacement of the system.
If a septic system has secondary treatment and is not creating a public health or environmental hazard, the system is not required to be upgraded.
The inspection validity of two years is set in Senate File 261.
The intent of SF261 was to establish a uniform inspection procedure and criteria for failure statewide. While counties have been encouraged to comply with this intent, there is nothing in the rules that preempts them from having more restrictive requirements.
Senate File clearly states that county sanitarians are qualified to become certified time of transfer inspectors. This language indicates that they cannot be exempted.
Packaged treatment systems or advanced treatment units are required by rule to be tested as part of the time of transfer inspection process.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Time of Transfer Inspection Fees

Comments:
Two comments were received regarding the fees to become a certified time of transfer inspector. These comments are given below.

- Requiring county or city environmental health staff to pay a fee from one government entity to another puts a hardship on the county or city when they are already responsible for doing that type of work. I have no problem with the certification process only using taxpayer money to pay another government entity.
- I am a bit concerned that potential local inspectors may give up traveling to limited training sessions some place far away especially given the new $300.00 bi-annual fees.

Discussion:
The fees for time of transfer inspectors are the same as the fees for a well driller or well pump installer. These fees are necessary to fund the considerable time involved with certifying inspectors and providing training. Training materials are being developed with the assistance of the University of Missouri and Des Moines Area Community College. This undertaking would not be possible without their assistance. The management of the time of transfer program is in itself a full time position. As you are aware, the onsite wastewater program currently has one FTE.
The intent of SF261 was to have county sanitarians follow the same certification procedure as private inspectors. In the interest of fairness, it was felt that the fees should be the same for all individuals.

The Onsite Training Center of Iowa, located and operated at DMACC in Ankeny, offers classes around the state on a regular basis. The current schedule has 4 of the 6 planned time of transfer inspector courses at locations around the state. The typical annual schedule for training has 60% of the courses around the state. The Department feels this alleviates any concern that the people needing to be trained have to travel a great distance.

Recommendation:

It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Onsite Systems Covered by NPDES General #4

Comments:

Two comments were received concerning what systems are covered by General Permit #4. These comments are paraphrased below.

- Language in discharging system section refers to required sampling in accordance with GP4 for all systems. This is not the case if the system does not discharge to a designated water of the state or a subsurface drainage tile. This language is confusing and should be clarified in each discharging system section.
- All systems that discharge to the surface should be sampled to ensure they are properly functioning.

Discussion:

The language in each rule section concerning discharging systems does say all systems should be sampled according to NPDES General Permit 4 requirements. Originally the thought was to refer to the General permit for those requirements and at that point it would be apparent that a particular system did or did not require sampling. Upon further review it is apparent that this is misleading and should be clarified.

As the Commission is aware, we have limited General Permit #4 and its requirements to those systems that discharge to a designated water of the state or a subsurface drainage tile. The purpose for this is to focus more on the systems that have the greatest potential for impacting water quality and to be more capable of monitoring these systems to ensure compliance. As such, all discharging systems will no longer be required to be sampled depending upon their proximity to a designated water or a subsurface drainage tile.

Recommendation:

The language after each discharging system section in the rules should include the phrase "if applicable" to clarify that only those system that discharge to a designated water or a subsurface drainage tile are required to sample the effluent.

It is recommended that the EPC adopt other amendments as proposed.

Issue: Required Use of the Onsite Wastewater Tracking System is a Burden to Counties

Comment:

One comment was received regarding the Department's new web-based onsite wastewater tracking database. That comment is given below.

- Using the web-based system will require additional time for the county or city without any reimbursement. It may require some offices to obtain equipment at their cost for scanning forms, etc.

Discussion:
The Department's new Onsite Wastewater Treatment Systems database was created with considerable input from counties. County personnel made up the bulk of the Stakeholders Committee and the contractor visited numerous counties to ensure that the features the counties wanted were included in the database. The database will be the first available database for many smaller counties that have been working with only paper records to this point. Nearly all the counties have been trained in the use of the database and are eagerly awaiting the complete rollout of the system anticipated within the next few weeks.
The uses of the database are many and include file sharing between counties and the Department and a new information gathering capability never before achievable. The use of the database has been included in the rules to gather basic information about septic systems installed in Iowa. The requirements are few; homeowner, address, type of system, date installed and discharging system information. The database actually is capable of storing vast quantities of information beyond these basic items. The Department has limited the amount of information that is required to be entered to reduce the amount of effort needed by counties. We feel the benefit of the system far outweigh the minimal effort to enter basic information.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: The Trench Sizing, Soils and Percolation Charts are Too Complicated

Comments:
A number of comments were received concerning the complexity of the new charts for sizing soil absorption systems. These comments are paraphrased below.

- These tables complicate the information that was simplified with the last revisions to Chapter 69 in 1998.
- Simplify lateral length requirements. More complicated loading rates are not necessarily better.
- I think a little more user-friendly chart would be nice.
- Loading rates for trenches/beds should be based on the long-term acceptance rate of the soils.
- The loading rate/percolation rate chart leaves some ambiguity when sizing a system. Some clarification would help.
- As far as the sizing charts for soils absorption systems, I'd like to see the charts simplified for use across the state.

Discussion:
Soil loading rates and soil analysis are the best method available to determine the size and proper placement of a soil absorption system. Iowa has long used only percolation tests in its rules as the method for sizing soil systems although some areas do utilize soil analysis. The addition of soil loading rates is needed to begin moving more towards the use of soil analysis for soil system sizing. This method is more consistent than percolation tests and less prone to error or the effects of weather conditions. Using soil loading rates and trench bottom square footage provides a scientifically proven method to determine the rate at which a certain type of soil will accept effluent over a prescribed area.
It is important that county sanitarians are comfortable with the charts used for sizing in Chapter 69. The proposed amendments include both soil loading rates and percolation test results to allow the sanitarians and installers to correlate the two while continuing the use of both methods. Every effort is being made to provide technical advice and training to increase the proficiency of sanitarians with soil loading rates and the new charts. The proposed amendments only require one additional step in sizing a soil absorption system. This step will begin to familiarize sanitarians with soil loading rates for the eventual move to soil analysis alone
Soils trainings are also offered through the Department's Onsite Wastewater Training Center. A full curriculum on soils is being developed that will compliment the proposed tables and the information they provide.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Chamber Should be Allowed as Sand Filter Collector Lines

Comment:
One comment was received about the use of chambers for sand filter collector lines. That comment is given below.

- I would like to see the chamber material added to this section as I feel it is better than some of the options listed.

Discussion:
While chambers are not specifically mentioned for use as sand filter collectors, they have been, and will continue to be, allowed for this use.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Chamber Systems Trench Sizing Should Not Change from the Current Code and Expanded Polystryrene Aggregate Systems Should be Sized Similar to Chambers

Comments:
Numerous comments were received regarding the sizing of narrow chambers and expanded polystyrene aggregate systems (EPS). These comments are paraphrased below.

- Current rules allow for narrow chambers to be sized as equivalent to a two-foot wide gravel soil absorption trench. Current rules also allow for a 34-inch wide chamber to be sized as equivalent to a three-foot wide gravel trench. Proposed changes would eliminate the use of narrow chambers. We respectfully request that the existing sizing be maintained.
- The proposed rules will allow for gravelless products less than 12-inches tall to enter the marketplace. We are vehemently opposed to this, for very practical, performance-related reasons.
- We support the same minimum and maximum excavation width requirements for all private sewage disposal system trench technologies. The 90 percent requirement should be eliminated.
- ISI would like to maintain our current approval for the EQ24 Chamber (12" tall) and the Q4 EQ24 LP Chamber (8" tall), each receiving 2 square feet of credit per linear foot.
- ISI would like to have a similar approval for the EQ36, whereas the 2 ft (nominal width) chamber is approved at 3 square feet of credit per linear foot.
- The rule should add a third column to the sizing chart for 18" inch trenches and include the narrow chambers here.
- EPS aggregate that has a nominal size of 12" in diameter should be sized as equivalent to a two-foot wide gravel trench similar to the sizing for narrow chambers.
- If 8" tall narrow chambers are allowed they should be sized up 33% since they have 33% less sidewall. An alternative would be to require all drainfield products to be 11" inches tall at a minimum (the height of a standard narrow chamber).

Discussion:
Chambers have been used successfully in Iowa for over 10 years. They are used as an alternative to gravel and perforated pipe and have been particularly useful in areas where the gravel is poor for use in soil absorption trenches. Expanded polystyrene aggregate has been used successfully in the southeast United States for 15 years and has recently begun to be sold in Iowa. It is also used as an alternative to gravel and pipe.
When the new rules were proposed, trench sizing for these products were discussed at length by the Stakeholders Committee. One concern raised was that when using trench bottom square footage for sizing, we should guard against using a very narrow chamber in a wide trench and being credited for the wide trench sizing. As such, we eventually added language requiring the trench product to fill 90% of the trench bottom. An unintended consequence of this language was the elimination of standard (or narrow) chambers from use. These chambers have been used successfully for over 10 years at the sizing in the current rules.
Expanded polystyrene aggregate has been sized similarly to standard or narrow chambers with success in more than 20 other states. Third party studies from North Carolina and Oregon were provided to the Department support this conclusion.

When chambers and expanded polystyrene aggregate (EPS) are evaluated, they are typically compared to gravel and perforated pipe trenches. Gravel trenches have been used since the 1950's with great success and are considered the standard for soil absorption systems. However, there are drawbacks to gravel, the biggest of these being fine particles in the gravel that can plug the bottom of the soil absorption trench. This drawback is also the biggest advantage that chambers and EPS have over gravel. For this reason these products are usually sized as equivalent to a two-foot wide gravel trench. The logic here is that the amount of effluent storage and soils contact area is approximately the same between a standard chamber or EPS bundle and a gravel filled trench. Wider chamber can be considered equivalent to a wider gravel trench. These comparisons are based on the standard gravel trench that contains 12 inches of gravel in depth. Very small chambers (8 inches tall) may not adequately compare to a 12-inch deep, 2-foot wide gravel trench.

Recommendation:
The current sizing for standard (or narrow) chambers should be maintained as equivalent to a 12-inch deep, 2-foot wide gravel trench. EPS 12 inch bundles should be sized similarly.
The current sizing for wide chambers should also be maintained. The current sizing is chambers 33 inches wide are considered equivalent to a three-foot wide gravel trench. EPS systems that are three feet wide should be sized similarly.
Narrow chambers that are less than 11 inches tall should not be allowed since they do not adequately approximate a gravel trench 12 inches deep and two feet wide. This can be accomplished by requiring 6 inches of sidewall above the invert of the inlet for chambers.

Issue: The Wetland Design Specifications are Outdated

Comments:
Several comments were received regarding the constructed wetland section and the need for updating. These comments are paraphrased below.

- The plant list for wetlands is outdated and the latest information would include the plants provided in the attached list.
- Mulch should be used on top of the wetland cell.
- I would recommend that the effluent from the septic tank be treated before discharge to the wetland.
- To establish plant growth and provide for soil infiltration it would seem a liner should not be required.

Discussion:
The wetland section was not changed due to the time constraints associated with the time of transfer implementation date. The Department realizes this section is outdated but needs to move forward with the proposed rules to meet the July 1, 2009 implementation date for time of transfer. Wetland systems only account for approximately 1% of all onsite wastewater treatment systems in Iowa.

The wetlands in use have performed well without the effluent being treated prior to discharge to the wetland. BOD and TSS values are typically below 25 mg/L.
Liners are required to contain the effluent while it is being treated

Recommendations:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Additional Definitions Needed

Comments:
Several comments were received concerning the need for additional definitions. These comments are paraphrased below.

- Add definitions of absorption bed and at grade systems.
- The drainage ditch definition is outdated and is not used in the rules. It should be removed.
- Under private sewage disposal system it reads "non-residential, but does not include industrial waste," but there is no definition of industrial waste given.
- A definition of industrial waste should be included.
- As proposed in the definitions section of the new rules, the requirement relating to the location of the geotextile barrier in the EPS aggregate system is a proprietary specification. As such it is exclusionary, and thus has no place in any set of rules.
- The definition of EPS aggregate does not specify the diameter of the product. It comes in smaller sizes.

Discussion:
The Department's Legal Bureau requested that the definition of drainage ditch be removed from the proposed rules because it was outdated and is not referenced in Chapter 69.
Septic systems are intended for domestic wastewater treatment only. The introduction of any industrial wastes may classify a soil absorption system as a Class V injection well. New Class V injection wells are prohibited by the U.S. EPA. Therefore, the rule states that domestic waste only may be discharged to a septic system and further states that industrial waste is prohibited. Domestic waste is defined in Chapter 69 but industrial waste is not. This definition, like many others in the Departments wastewater rules, is included in Chapter 60. Each Chapter cannot contain a definition for every term used in the rule. This is why Chapter 60 contains only definitions.
Definitions are typically only required when an unfamiliar term is used repeatedly throughout a rule. Absorption beds and at-grade systems are not used outside of the construction standards that describe and define them.
The proposed definition of EPS aggregate contains a description of a geotextile fabric that is proprietary to Ring Industrial. The rule should not exclude other potential products based on this definition. Ring Industrial has agreed that this portion of the definition should be removed.

The EPS also failed to mention the diameter of the bundle. These EPS bundles come in various sizes. In order to maintain the abovementioned approximation to a 12-inch gravel depth, the definition should specify 12-inch bundles.

Recommendation:
Remove the drainage ditch definition.
Remove the geotextile wrap portion of the EPS definition and define the EPS system as a 12-inch bundle.
It is recommended that the remaining definitions in Chapter 69 be adopted as proposed.

Issue: Soil Trenches are Limited to a maximum of 100 feet

Comments:
Two comments were received regarding the language about the maximum length of soil trenches. These comments are paraphrased below.

- There is no restriction on the length of a field using drop boxes. The language in Ch.69 is for systems with distribution boxes where 100 feet is a maximum. This is confusing for drop box systems.
- Please clarify that trenches do not have to be equal if a system is serial loaded or has "rollovers".

Discussion:
When a distribution box is used for a soil absorption system, its purpose is to equally distribute the effluent to each trench attached to the distribution box. Therefore these trenches must be equal in length. A serial distribution system allows each trench to "fill up" before the next trench is used. These trenches do not have to be equal in length. The proposed rules do not prohibit trenches in a serial distribution system from being unequal in length.
Most soil absorption systems in Iowa are gravity fed. The requirement for trenches no longer than 100 feet is an attempt to ensure that trenches do not reach a length where effluent can never reach the far end. This is the case whether a distribution box is used or serial distribution. Without a maximum, septic systems could have one long trench. Experience shows that gravity distribution is not adequate to disperse effluent in most trenches especially if they are excessively long. If pump dosed systems were required trenches could be longer. This would increase the cost and maintenance for soil systems.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Reference to the Electrical Code

Comments:
One comment was received about the need to reference the national electrical code. That comment is given below.

- The code should include a reference to electrical components and wiring meeting the NEC.

Discussion:
Septic systems with pumps and alarms require wiring to operate the electric components. This wiring should be installed according to the national or local electrical code. However, sanitarians that inspect these septic systems are not qualified to inspect electrical components for compliance with the national electrical code. Most rural areas do not have electrical or building inspectors. Local requirements should deal with this issue.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Sizing and Construction of Mounds

Comments:
Two comments were received concerning the sizing and construction of mounds. These comments are paraphrased below.

- The width of the mound should be determined by the use of linear loading rates.
- Mound systems should have surface water diverted away from the uphill portion of the mound.

Discussion:
The standard for the design of mound systems is a design document authored by Dr. Jim Converse, Retired Professor Emeritus, University of Wisconsin, often considered the "father" of mounds. His manual does in fact use linear loading rates to figure the length and width of mounds. However, this method is engineering intensive and quite complicated for most laypersons. The Department is trying to encourage the use of mounds and other non-discharging systems and have had difficulty convincing sanitarians and installers to use mounds because they consider them "too complicated". We feel the design standards proposed are an improvement from the existing rules and will keep the systems within the grasp of most people in Iowa.
The proposed rules do include a construction standard to divert surface water away from the mound.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Construction Requirements for At-Grade Systems

Comments:
Three comments were received regarding the construction specifications for at-grade soils absorption systems. These comments are paraphrased below.

- The maximum depth of an at-grade system should be 18" instead of 12".
- At grade system width should be determined by the linear loading rate.
- A section on the appropriate cover for an at-grade system should be included similar to the cover section of a mound system.

Discussion:
At-grade systems are a type of mound that utilizes more soil absorption than the mound and does not use sand for treatment. They are used when a limiting layer limits the depth of soils absorption trenches. Soil is mounded over the at-grade system and effluent is pumped into it in small doses. A 12-inch depth allows a soil absorption system to be installed when a limiting layer is four feet from the surface. If the trench or "hole" dug for an at-grade can be 18 inches deep then a conventional trench system can be installed. As mentioned in the above comments about mounds, the linear loading concept is too complicated at this time for use in Iowa.
At-grade systems should be covered in a similar fashion to mounds. The cover standard was omitted in the proposed rules and should be added.

Recommendation:
Add a cover section to the at-grade standards similar to the section found in the mound construction standards.
It is recommended that the remaining sections of the at-grade standards be adopted as proposed.

Issue: Drip Irrigation Construction Standards

Comment:
One general comment was received about the need to update the drip irrigation system construction standards. This comment is paraphrased below.

- The entire drip irrigation system section should be updated.

Discussion:
The drip irrigation section is short and relied on industry experts to assist installers with the appropriate installation standards. This section could be updated but was also passed over because of the time restraints imposed by the time of transfer implementation date. Drip irrigation systems account for less than 1% of septic systems in Iowa.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Septic Tank Lids to the Ground Surface

Comment:
One comment was made about the requirement for septic tank lids to the surface. That comment is given below.

- While I agree access is critical, when it comes to existing systems that we have already made someone bring to within 1 foot of finished grade at a time of transfer, I'd prefer to educate instead of insist on another riser. Again leave it up to the counties.

Discussion:
Septic tank lids are proposed to be brought to the surface for two reasons. The first is it will remind people they have a septic system and it requires routine maintenance. Secondly, effluent screens will be required in the outlet baffles of tanks. These effluent screens require regular maintenance and must be accessible.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Packed Bed Media Filters, Definition and Requirement for Use

Comments:
Two comments were received concerning the use of the term packed bed media filter and the requirement for use prior to other systems. These comments are given below.

- Add sand filters and packed bed media filters. First, sand filters are significantly different than your definition of a packed bed media and should be listed in the section title. (Actually I think they should have separate sections.)
- Preferences stated for packed-media beds in the aerobic treatment units and constructed wetlands because of higher maintenance really are more opinion. A regulation should stick to getting compliance on treatment and regulators to just giving out full disclosure on requirements for each type of system - leave it to the property owner to select.

Discussion:
The Consortium of Institutes for Decentralized Wastewater Treatment (CIDWT) is a national college based group of onsite wastewater training centers. This Consortium has developed a glossary of onsite wastewater terms in an effort to standardize terminology nationwide. This glossary considers all media filters "packed bed media filters" with the only difference among these units being the type of media. They all operate in the same manner whether they use sand, peat or textile.
National and local experience has shown that aerobic treatment units (ATU's) and wetlands are maintenance intensive. ATU's are small packaged treatment plants that currently require perpetual maintenance contracts. Wetlands require considerable maintenance of the plants. Media filter have been shown to be more reliable and less maintenance intensive.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: National Sanitation Foundation (NSF) Certification for Peat Filters

Comment:
One comment was received about the requirement that peat filter meet NSF requirements for wastewater treatment devices. This comment is paraphrased below.

- As you will notice our peat filter more than meets the Class 1 Effluent Standard as described by NSF International.

Discussion:
National Sanitation Foundation (NSF) Standard 40 tests wastewater treatment devices and issues Class I certification to devices capable of producing effluent with BOD and TSS less than 30 mg/L. This Standard is used to ensure a treatment device can meet effluent standards and to ensure treatment devices are manufactured by reputable companies. The drawback to NSF certification is the cost to companies and the testing uses city wastewater that is not representative of single-family home wastewater. For this reason the proposed rules include the opportunity for the Department to accept equivalent testing for the approval of treatment devices. These peat filters will not be excluded on this basis.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Requirement for Soils Analysis

Comment:
One comment was received concerning the need to require soil evaluations instead of percolation tests. That comment is given below.

- A soil evaluation should be used in place of a percolation test.

Discussion:
While soil evaluations are the best method to determine soil absorption system sizing, Iowa does not have soil evaluators in place to move entirely away from percolation tests at this time.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: All Onsite Systems Should Require Maintenance

Comment:
One comment was received regarding the need to require maintenance on all systems. That comment is given below.

- Maintenance should be included and required on all systems.

Discussion:
While maintenance of all systems would be the ideal situation, Iowa is not ready to require inspections or maintenance on every septic system. We do continue to move in that direction primarily with discharging systems.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Soil Trench Construction Techniques and Aggregate

Comments:
Two comments were received about the way soil trenches are constructed and the use tire chips as aggregate. These comments are given below.

- Sidewall smearing is a problem most of the year with trench construction. Consideration should be given to require that any smearing of the trench wall and bottom area be corrected by "roughing" the soil.
- Chipped tires have been used successfully in other areas in place of gravel. This may or may not be of interest in Iowa.

Discussion:
Digging trenches in wet soils can cause the trench to "seal" and hinder the movement of effluent. The proposed rules require that construction cease when soils are wet until the conditions improve.
Chipped tires have been used in some areas in southern Iowa. They can still be used under the experimental section of the proposed rules. Chipped tire availability is limited across the state.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Pumping System Alarms and Volumes

Comments:
Two comments were received concerning the use of pump alarms and pumping volumes. These comments are paraphrased below.

- Pump systems should have the alarm system on a separate fused circuit from the pump. So that when the pump shorts out the alarm would still work.
- Pumping volumes from filtered pump vaults should be set similar to Oregon code requirements.

Discussion:

It is strongly recommended that alarms be on separate circuits. This is the general practice in Iowa.
Pumping volumes for filtered pump vaults was set at 50 gallons to allow the use of these devices for systems that utilize small doses. However, it is felt that systems that dose larger volumes should use a separate pump tank to avoid disturbing the sludge in the septic tank. Oregon has far more filtered pump vaults in use than Iowa and has conditions that are very different.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Requested Additions to the Vault Toilet Section

Comments:
One comment was received about the requirements for pit privies or vault toilets. That comment is given below.

- Improvements have been made for vault toilet designs to reduce odors. I would recommend the design used by the National Park Service and the Blair latrine used in southern Africa be incorporated in the vault toilet requirements.

Discussion:
Vault toilets are primarily used in parks in Iowa. Odors are not typically a big issue. Vault toilets are the most economical method of waste disposal for county and state parks and are a proven method of waste collection.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Requirements for Connection to Public Sewers

Comments:
Several comments were received concerning the requirements to connect to a public sewer. These comments are given below.

- Bonds that cover the construction of sewerage systems rely on connections to the sewer to pay for the bonds. When sanitary sewers are constructed the cost is most reasonable when properties on both sides of a sewer line connect to the sewer. It should be clear when establishing a sewer district which properties are to connect to the sewer to pay for the project and continuing operation and maintenance. 69.1(3)a is not clear on requirements to connect to a publicly owned treatment works (POTW). POTW is not defined which could result in a legal exception for connection. A POTW could be defined as the sewage treatment plant which would have few properties within 200 feet.
- This section would allow a private sewage disposal system to continue in use, when a sewer is available as long as it is not repaired or rehabilitated.

- Allows the administrative authority to set a time frame and conditions for
- connection which could be never. Sewer bonding needs a more definitive time frame.
- I would recommend that Section 69.1(3) be reviewed by the state's bond counsel.

Discussion:
Bonds are not the financing method of choice for wastewater projects in Iowa. While the proposed rules require hook-up to a public sewer when available, cities and local authorities have the final say as to whether someone is connected to their sewer system. USDA financing typically does require hook-up as part of the financing agreement.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: The Use and Requirement of Grease Interceptors

Comments:
One comment was received regarding the requirement for the use of a grease interceptor for food service establishments utilizing a septic system. That comment is paraphrase below.

- I might suggest that there be some reference to local building/plumbing codes where applicable. In Waterloo/Cedar Falls for example any licensed food service establishment must put a grease trap on their system no matter what they prepare and/or serve.

Discussion:
The proposed rule allows the administrative authority to determine if a restaurant produces enough grease to warrant the need for a grease trap. Local ordinances can always be more restrictive than the minimum standards set in these rules.

Recommendations:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Septic Tank Construction Requirements

Comments:
Two comments were received regarding the construction of fiberglass septic tanks. These comments are paraphrased below.

- The flow through port in a tank partition should reference a square inch requirement instead of prescribing a horizontal slot or 4" baffle.
- Fiberglass tank tops should not require additional reinforcement and should reference an IAPMO standard.

Discussion:
Iowa requires two compartment septic tanks. The dividing wall must have some method to allow effluent to pass through while retaining solids on the inlet side. The two methods described in the proposed rules primarily refer to concrete septic tanks. Concrete tanks account for approximately 95% of all septic tanks installed. The use of more, smaller diameter pass through devices would be considered equivalent. Every arrangement cannot be addressed in these rules.
The reinforcement language again, primarily refers to concrete tanks. The purpose of the language is to ensure that tanks do not collapse. An IAPMO standard for plastic or fiberglass tanks could be considered equivalent.

Recommendation:
It is recommended that the EPC adopt the amendments to Chapter 69 as proposed.

Issue: Miscellaneous or Non-Specific Comments

Comments:
Several comments were received that were not specific to any of the above categories. These comments are given below.

- Septic systems in Iowa are a problem in many areas of the state. This is a contributing cause of water quality problems in the state. There should be some way to report potential septic system problems. When you drive by a rural property and see cattails in the ditch (when they are not present anywhere else), that is a good indicator. Also, there should be a state grant (loan) program when a problem is found to get the work done on a timely basis.
- The code should be performance based instead of prescriptive. This leaves the regulators in the role of monitoring and leave design, installation and operation to the homeowner.
- Add a preamble that states the purpose of the regulation such as these are minimum standards to assure the protection of public health, prevention of nuisances, protection of surface and groundwater from sources of pollution, etc. (state and local regulations in Michigan often have these)
- The title should not be changed to Private sewage disposal systems.

Discussion:
Potential septic system problems can be reported to the local county sanitarian. They are required to take action.
The Department operates a low interest loan program for the replacement of septic systems at existing homes in unincorporated areas. This program, OSWAP, is part of the non-point source pollution prevention program in the State Revolving Fund.
The debate about performance vs. prescriptive has been ongoing nationwide for many years. A performance-based code "certifies" technologies and then does not regulate their installation or the preference for use. This type of code is most often supported by industry. Prescriptive codes restrict the types of systems installed and are more conservative. Most states still have prescriptive codes.

The majority of rules in the Department's jurisdiction do not contain preambles. This is dealt with in the Department's mission statement.
The title is being changed to be consistent with the definition in Iowa Code.

Appendix A

Commentators

Following is a list of individuals and organizations that commented on the proposed private sewage disposal rules during the public comment period. The commentators are grouped into similar categories and are listed in no particular order.

County Environmental Health Staff (sanitarians)
Aimee Devereaux, O'Brien County
Allan Mathias, Clarke, Ringgold, Decatur Counties
Angela Green, Taylor County
Brain Hanft, Cerro Gordo County
Brett Meyers, Black-Hawk County
Cory Frank, Marion County
Don Nolting, Story County
Doug Bird, Bremer County
Eric Furnas, Muscatine County
Jon McNamee, Black-Hawk County
Kay Mocha, Pottawattamie County
Sue Irving, Jasper County
Bob Summers, Clinton County
James Lacina, Johnson County
Dan Kramer, Johnson County
Frank Frieburg, Jackson County
Erin Pettypiece, Johnson County
Jim Holley, Des Moines County

Business and Industry
Judy Krieg, Earthview Environmental
Len Moore, Moore Marketing
Tom Ashton, American Manufacturing
Jim Warner, Warner Engineering
Jim Carroll, USDA Engineer and Onsite Consultant
Dennis Hallahan, Infiltrator Systems Inc.
Ben Berteau, Ring Industrial
Dick Bachelder, ADS Manufacturing
Nick Noble, Orenco Systems Inc.
Dennis Keitel, CDM Engineering
Barry Johnson, CDM Michigan

Citizens
Mark Bohner